PLAN FOR INTERIM STATUS CLOSURE

AT

INDUSTRIAL SERVICE CORPORATION Kansas City, Missouri

May 15, 1992 Revision 0

PART A



INTERIM STATUS CLOSURE PLAN INDUSTRIAL SERVICE CORPORATION

PART A WORK PLAN

REVISION 0

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1.0 INTRODUCTORY SUMMARY

This Interim Status Closure Plan and the Financial Assurance Mechanism for Closure have been prepared in accordance with the requirements of 10 CSR 25-7.265 (g) and (h), 40 CFR 265.116, 40 CFR 265.119, and 40 CFR Part 265 Subpart (G). This plan identifies all steps that will be necessary to close those storage units shown on the Part A Application originally submitted in 1980. This work plan supersedes all previous submittals made with respect to this closure.

Industrial Service Corporation (ISC) will maintain an on-site copy of the approved Closure Plan and all revisions to the plan until the certification of closure completeness has been submitted to and accepted by the State of Missouri, Division of Natural Resources (MDNR) and the U.S. Environmental Protection Agency (EPA). It is anticipated that the starting date for Interim Status closure activities at the facility will be during 1992.

2.0 FACILITY DESCRIPTION

2.1 GENERAL DESCRIPTION

Industrial Service Corporation (ISC) is a Missouri Corporation with corporate headquarters based at 1633 South Marsh, Kansas City, Missouri. ISC owns and operates a Resource Recovery and an interim status TSD storage facility located at 1633 South Marsh Avenue in Kansas City, Missouri. The USEPA ID Number for the facility is MO073027609.

Plate 2-1 is a USGS topographic map depicting the generalized location of the facility. The facility is in an area that is zoned for industrial use. Areas bordering the facility include residential and industrial areas.

The ISC facility is primarily used for the bulk storage and processing of used oil and contains 18 above ground storage tanks in the tank farm. An additional 16 former above ground storage tanks which have been taken off their foundations and taken out-of-service are stored in the secured area along the east side of the facility. The out-of service tanks were removed from the tank farm and are stored pending testing and final disposition upon approval of this Closure Plan. Plate 2-2 depicts a site plan of the facility, including piping layout.

Used oil is the primary constituent stored on site along with lesser amounts of diesel, hydraulic and other miscellaneous oils. ISC does not handle PCB oils or any related products/by-products. Total on-site storage capacity of in-service tanks at ISC is 588,850 gallons. ISC is certified by the Missouri Department of Natural Resources (MDNR) as a Resource Recovery facility (RR-004).

Industrial Service Corporation is a multi-state transporter, collector, processor and distributor of used oil. Customers from whom ISC collects used oil are service stations, railroads, retail auto dealers, car dealers, tune-up and auto repair shops, transmission shops, farm implement companies, truck and car leasing companies, and other general

business establishments. This used oil recycling facility and subsequent marketing activities are operated within guidelines as specified in 40 CFR 266.40.

The facility began its operation at 1633 South Marsh Avenue on or about 1958 as a used oil collection and processing facility dba Radium Petroleum. ISC acquired the site in Kansas City, Missouri in 1974 from the former owner (Mr. Sam Hewitt) who originally founded Radium Petroleum. It is believed that waste oil reprocessing is the only activity that has occurred at the site.

2.2 SUMMARY OF PREVIOUS INVESTIGATIONS

Industrial Service Corporation (ISC) owns and operates a resource and recovery facility at 1633 South Marsh in Kansas City, Missouri. A number of field investigations have been undertaken to determine the type and extent of petroleum contamination presently underground at the facility.

In June 1986, Ecology and Environment, Inc., an independent consulting firm, was contracted by USEPA to conduct a RCRA facility assessment to determine if there had been a release of hazardous waste or hazardous constituents from solid waste management units. As a result of this site investigation, it appears that a petroleum product had migrated into the ground west of the facility.

In October, 1986, nine monitoring wells were installed at the site by ISC to track fluid levels and to collect any petroleum product coming into the wells. Locations of the wells are shown on Plate 2-3. Measurements were kept for a brief period after installation and then discontinued. Any data from the wells is inconclusive because of inadequacies in well design, although the data does give an indication of what contaminants are present.

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From subsequent correspondence with the USEPA and MDNR, it was agreed that a Work Plan would be developed by ISC and approved by the USEPA and MDNR for remedial action alternatives at the site.

Further site investigations were conducted on December 31, 1987 and January 2, 1988, when ISC contracted Total Environmental Services and Technologies to drill seven soil borings on the property belonging to the Livers Bronze Company, 1608 Marsh, located immediately to the west and northwest of the ISC facility. Locations of the borings are found on Plate 2-3. The purpose for drilling the borings was to determine the extent of the contaminant plume from the tank farm area. Two borings (TH-2, TH-3) encountered hydrocarbon contamination at depths of 23-26 feet below ground level.

On April 5-6, 1988, three borings (SBH-1, 2 and 3) were drilled, cored and sampled within the tank farm. Locations of the borings are shown on Plate 2-3. The borings provided data concerning subsurface geology beneath the tank farm as well as an indication of the extent of soil contamination beneath the facility. Samples were analyzed for volatile organic compounds (VOCs), Pesticides/PCBs, and EP Toxicity metals. Seven VOCs, six Pesticides/PCBs, and four metals were found above detectable limits.

During January 1992, the nine monitoring wells that had been installed in the fall of 1986 were plugged and abandoned after casings had been pulled out of the ground. The activity was undertaken after it was determined that well construction methods were inadequate, and that the wells provided a potential conduit for hydrocarbon contamination to move from the surface to the water table.

3.0 SITE DESCRIPTION

3.1 REGIONAL GEOLOGY

3.1.1 Regional Physiography, Topography

The Industrial Service Corporation facility is located in western Jackson County, Missouri. Plate 2-1 is an enlargement of the U.S.G.S. 7 1/2 minute topographic map of the area around the ISC facility.

The dominant physiographic feature of Jackson County, Missouri is the Missouri River flood plain. The river forms the northern border of the county. The flood plain ranges in width from 1/4 mile to more than 3 miles. Most of the plain is level or nearly level.

Adjacent to the flood plain and to the south are moderately sloping to steep loess covered hills and bluffs. The rest of the Jackson County consists of gently to moderately sloping upland areas interrupted by flood plains of the Blue River, Little Blue River, Sni-a-Bar Creek, and their tributaries. Total topographic relief in the County ranges from as low of 690 feet where the Missouri River leaves the County to a high of 1105 feet in uplands areas in the south central part of the County.

Little evidence of glaciation exists in Jackson County. During the Kansas glaciation, the continental glacier pushed a short distance south of the Missouri River, but most glacial debris has since been covered by loess. Loess covers most of the bedrock on upland areas and is thickest near the Missouri River, becoming thinner to the south.

3.1.2 Regional Structure

The dominant structural feature of the Jackson County area is the Prairie Plains Monocline. Bedrock units dip gently down to the northwest into the Forest City Basin at rates averaging 10 to 15 feet per mile. The regional structural trend may be modified locally by smaller anticlinal or synclinal features.

3.1.3 Regional Stratigraphy

Bedrock in the region around the ISC facility consists of rocks of Pennsylvanian age. Pennsylvanian rocks in the region generally consist of sequences of alternating limestones and shales typical of cyclic deposition on a shallow marine shelf. Sandstone lenses of fluvial and/or strandline origin, and coal beds resulting from deposition in coastal swamps may also occur in the Pennsylvanian system. Figure 3-1 is a stratigraphic column showing Pennsylvanian age rocks exposed in the region. Pleistocene loess and related deposits blanket the bedrock in upland areas. Valleys of the larger streams are underlain by alluvium and flanked by terrace deposits.

3.2 REGIONAL HYDROGEOLOGY

3.2.1 Climatology

Jackson County has a subhumid, midcontinental climate characterized by cold winters and hot summers. The average annual precipitation is 35.75 inches. Latest freeze in the spring is about April 2nd. Earliest freeze in the fall usually occurs about October 31st.

During the winter, the average daily high temperature is about 33°F, with lows at night of 24°F. In summer, the average daily high temperature is 88°F. The maximum recorded temperature for Kansas City is 112°F, recorded on July 13, 1954. The lowest temperature on record for Kansas City is minus 23°F, recorded December 22, 1989.

Approximately 70 percent of annual precipitation falls between April and September. Thunderstorms occur on about 55 days each year, mostly during the summer. The greatest rainfall recorded in Kansas City in a 24 hour period is 7.45 inches on August 15, 1969. In September, 1977, as much as 12 inches rainfall in 24 hours was recorded along Rock Creek and Brush Creek in the Country Club Plaza district, causing severe flooding in that area. The average yearly snowfall is 22 inches. The greatest recorded snow depth was 21 inches.

PENNSYLVANIAN

BRONSON SUBGROUP SWOPE FORMATION

PENNSYLVANIAN SYSTEM-MISSOURIAN SERIES PLEASANTON GROUP MARMATON GROUP UNNAMED FORMATION UNNAMED FORMATION

SYSTEM

KANSAS

DENNIS FORMATION

SSOURIAN

CHERRYVALE

LINN SUBGROUP

FORMATION

GROUP

MI

SERIES

DRUM FA

SOURCE:

Missouri Geological Survey, 1961, Volume

3.2.2 Surface Hydrogeology

Jackson County is drained primarily by the Missouri River, which flows generally from west to east across the northern boundary of the County. The area is drained by three tributaries of the Missouri River, the Blue River, the Little Blue, and Sni-A-Bar Creek. All three streams flow from south to north across the area. The ISC facility is located within the drainage of the Blue River and is approximately 3.5 miles south of the confluence of the Blue River and Missouri River.

3.2.3 Regional Aquifers

The principle sources of ground water in the Jackson County area is the Missouri River Alluvium. This source is used by many communities in the area, including Kansas City, Missouri, Independence, and others. A number of center pivot irrigation systems have also been installed in recent years which draw water from the alluvium. Wells installed in the Missouri River alluvium may yield in excess of 2,000 gallons per minute (GPM), but in general average about 1,000 GPM.

Alluvium along smaller streams in the area, including the Blue River produces small amounts of water, primarily for industrial use. Water from bedrock formations in the area is of poor quality and below standards set by the United States Public Health Service for drinking water. Water from deep wells is high in chlorides and sulfates. Yields are low from shallow wells, averaging abut 5 GPM. Many shallow wells go dry during dry periods.

3.3 SITE GEOLOGY

3.3.1 Site Physiography

The ISC facility is situated on a stream terrace elevated above the east side of the Blue River flood plain. The river lies approximately 600 feet west of the site. The right-of-way for Interstate 435 lies between the site and the river.

The site has been modified by construction grading and related activities. Bedrock units are exposed in a west facing cliff which runs along the east side of the property. The

cliff marks the east boundary of the flood plain. Topography at the site is relatively level in the immediate vicinity of the tank farm, office and parking lot, sloping gently to the west toward the river. Surface elevations range from approximately 782 feet to 787 feet above Mean Sea Level. The east portion of the property consists of a cliff cut into the bluff with a steeply sloping hillside above, rising to an elevation of approximately 900 feet MSL. Immediately west of the site, a sharp break in slope marks the edge of the terrace deposits. The floor of the flood plain lies at an elevation of approximately 750 feet. The site lies on the cutbank side of a large meander of the river.

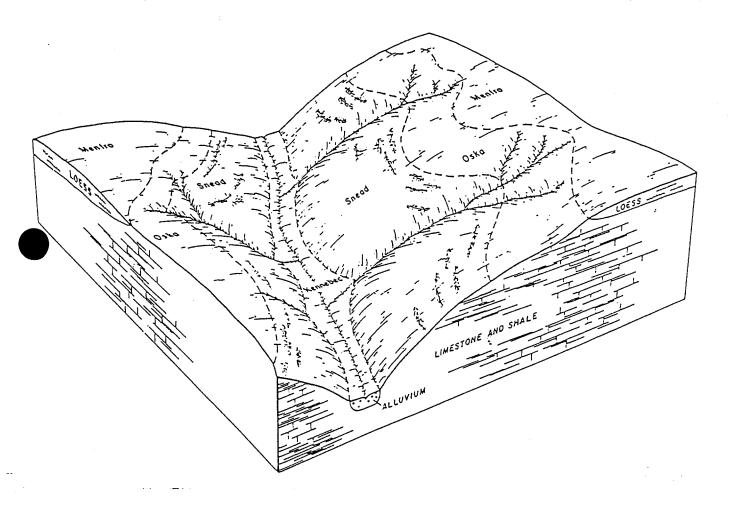
3.3.2 Surface Materials

Surface materials in the area around the ISC facility have been disturbed by past construction or grading activities around the site. Most of the facility is underlain by one to two feet of gravel or construction materials. Underlying the construction fill or undisturbed portions of the stream terrace are soils belonging to the Snead-Menfro-Oska association. These soils were formed in loess or residuum from shale and limestone. This association of soils consists of strongly dissected uplands adjacent to flood plains of intermediate to small streams.

Figure 3-2 shows the relationship between the soils and parent materials. These areas have numerous rock outcrops. Snead soils are well drained and found on the lower slopes of convex side slopes, such as are found along the Blue River. Oska soils are moderately deep, moderately sloping and well drained. These are found on convex side slopes at topographically higher elevations than the Snead soils. Menfro soils are found on gently to strongly sloping areas and ridgetops at higher elevations than either the Snead or Oska soils.

Most of the soils at the ISC facility belong to the Snead-Urban land complex. Typically, the Snead soils has a surface layer of black, friable flaggy silty clay loam about 7 inches thick. The subsurface layer is very dark gray, firm flaggy silty clay loam about 5 inches thick. The upper part is dark grayish brown, firm silty clay, and the lower part is

SNEAD-MENFRO-OSKA SOILS ASSOCIATION



SOURCE: U.S.D.A. 1984

Soil Survey of Jackson County, Missouri

FIGURE 3-2

RELATIONSHIP OF SOILS AND PARENT MATERIAL

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olive gray, mottled, firm clay. The subsoil to a depth of about 40 inches is olive, firm silty clay.

The Urban land part of this complex is covered by streets, driveways, buildings and other structures. These modifications to the natural surface materials obscure or alter the soil so that identification of the soil series is usually not feasible.

Included with this Snead soil and Urban land in mapping are small areas of Oska soils and rock outcrop side slopes and generally at a higher elevation than Snead soil. Oska soils are well drained and have a reddish subsoil found in narrow banks and are located at a higher position than the Snead soil. A few narrow limestone rock outcrops are in areas directly above the Snead soil. Permeability is slow in the Snead soil, and surface runoff is rapid. Natural fertility is low, and organic matter content is moderate. The available water capacity is low.

Geologic cross sections (Plate 3-1 and 3-2) were constructed using boring logs from investigations by Ecology and Environment in 1986, ISC in 1987 and again in 1988. Differences in lithologic descriptions made it difficult to accurately determine stratigraphic relationships beneath the site. Copies of boring logs are found in Appendix A-1.

After penetration of gravel or other fill materials at the surface, the first lithologic unit penetrated is a brown to dark brown silty clay. This unit ranges from 6 feet to 23 feet in thickness where penetrated, and appears to thicken toward the Blue River.

Borings in the tank farm area found this unit to contain a moderate density of plant root cavities running vertically through its entire thickness. This silty clay may be typical of wind-deposited loess found covering the floors of many alluvial valleys in the midwest.

After penetrating the loess, most of the borings encountered deposits more typical of alluvial deposition. Most of the borings encountered a generally coarsening downward sequence consisting of the following units (in descending order):

- 1. Clay silty: light brown, olive brown, grayish; ranging from 4 to 20 feet thick. Near the edge of the valley, this unit lies directly on top of bedrock.
- 2. Silt clayey, light brown to gray. Penetrated thickness ranges from 1 to 12 feet. The clay and sand units are representative of flood deposition in areas lateral to the stream channel.
- 3. Sand Very fine to coarse grained; gray to tan; with pebbles. Penetrated thickness (one boring) is 26 feet. This unit was not penetrated beneath the ISC property. These sands are probably representative of point bar sands in the upper part of a stream channel.
- 4. Sand, Gravel, Boulders penetrated in one boring 13 feet thick. This unit represents old channel deposits and lies directly on top of bedrock.

Monitoring Well MW-6 penetrated approximately 27 feet of red and gray clay. Because of the close proximity of the boring to the valley edge, the clays are most likely a weathering product (residuum) of the adjacent limestone and shale outcrops.

Five borings have penetrated bedrock. Three on-site borings encountered bedrock at depths ranging from 14 inches to 45 feet. Discounting outcrops on the east side of the facility, elevations of bedrock in borings ranges from 786 feet to 741 feet MSL, sloping downward from east to west. A short distance off site, in Boring TH-1, bedrock was encountered at a depth of 77 feet (694 feet MSL). The three on-site borings encountered limestone bedrock, the two off site wells encountered shale.

Bedrock outcrops are found along the east side of the ISC facility and consist of limestone and shale sequences belonging to Pennsylvanian age formations of the Kansas City Group. Included in the exposures are members of the Swope Formation. The Swope Formation consists of three members described as follows in descending order:

KANSAS CITY GROUP

<u>SWOPE FORMATION:</u> The Swope formation consists of three members, described as follows (in descending order).

- 1. <u>Bethany Falls member</u> The Bethany Falls is probably the most extensively quarried Pennsylvanian limestone in western Missouri. Typically, it forms a single massive ledge in most exposures. A pronounced parting separate the wavy-bedded lower part of the member from an upper, generally somewhat thicker, nodular part. The uppermost part of the member is oolitic over wide areas. The member is chert-free in most areas and is about 20 feet thick.
- 2. <u>Hushpuckney member</u> The Hushpuckney consists of dark gray to black fissile shale in its lower and middle parts and becomes a gray shale in its upper part. The thickness of the member ranges from 1 to 3 feet.
- 3. <u>Middle Creek member</u> The Middle Creek member contains one to two thin beds of dark gray limestone that have well develop vertical joints. Locally, a great many Bryozoa are present in the thin beds of gray shale which are associated with the limestone. The average thickness of the member is less than 1 foot.

Bedrock units belonging to the lower part of the Kansas City Group and upper portion of the Pleasanton Group subcrop in the east wall of the alluvial valley fill beneath the facility, but are not exposed in outcrop. The following is a generalized description of those units which form the lower portion of the valley wall:

KANSAS CITY GROUP

LADORE FORMATION: The Ladore typically contains clay and shale, the total thickness of which is less than 5 feet in western Missouri. Clay in the Ladore occurs at the top of the unit and is thin and silty at most localities. The formation thins to less than 1 foot thickness where it overlies bioherms in the upper part of the Sniabar. The formation is as much as 15 feet thick to the east of Kansas City in Carroll and Livingston Counties where sandstone may occupy all or part of the unit. Fossils are generally scarce.

<u>HERTHA FORMATION</u>: The Hertha formation includes two limestones, the Critzer at the base and the Sniabar at the top, and an intervening shale member, the Mound City. The average thickness of the Hertha is approximately 15 feet.

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PLEASANTON GROUP

<u>UPPER FORMATION</u>: The Warrensburg member and an unnamed member which lies above it together constitute the uppermost formation of the Pleasanton group. The upper unnamed member consists of gray shale which may be overlain by a micaceous fine-grained sandstone. The average thickness of the unnamed member is about 25 feet. The micaceous sandstone does not appear to be present in the site vicinity. The lower or Warrensburg member is quite variable in thickness and lithology, including gray shales, channel sandstones, coal, calcareous marine sandstone. The maximum thickness of the Warrensburg is as much as 150 feet.

3.4 SITE HYDROGEOLOGY

3.4.1 Surface Hydrogeology

The ISC facility is located along the east edge of the valley of the Blue River. In general the site slopes from east to west toward the river. During periods of heavy rain, the facility receives runoff from the hillside above the site. A small gully also enters the east side of the south parking lot area bringing runoff from the hillside.

The tank farm area was designed such that surface runoff within the limits of the facility drains into a 25,000 gallon containment pit located near the northwest corner. Stormwaters collected from the tank farm are periodically collected and disposed of in the Kansas City, Kansas sewer system under conditions of contract agreement.

At present, the entire north half of the tank farm is floored with concrete. The south quarter of the tank farm is also underlain by concrete. During April, 1987, a number of waste oil tanks were removed from an area stretching east to west across the middle portion of the tank farm. During removal activities, the concrete floor in that area was removed. As a result, the area is now underlain by gravel fill materials. Runoff from the unfloored area and from the south quarter of the tank farm now pond near the center of the tank farm. The floor of the area where the ponding occurs is gravel, beneath which is a layer of silty clay and/or silt. Drainage flow lines are shown on Plate 2-2.

Outside of the tank farm area, runoff from the rest of the facility drains to ditches along either side of South Marsh Street. These ditches flow to the north towards Truman Road, where the flow is intercepted by storm sewers.

3.4.2 Subsurface Hydrogeology

The presence and thickness of soils at the site is variable. Most of the driveway and parking areas are underlain by gravel and clay fill materials. Remnants of Snead soils may remain beneath the fill, soils are moderately well drained, slowly permeable. Permeability of soils in the Snead complex ranges from 0.06 in/hr to 0.2 in/hr. Available water capacity ranges from 0.12-0.16 inches per inch. PH of the soils range from 6.1 to 8.4. Clays in the soil may have moderate to high shrink-swell potential.

Below surface fill materials or soils at the site, the subsurface consists of interbedded clays and silts. Thickness and lateral extent of individual lithologic units is quite variable. Vertical and horizontal permeability within and between units is likely to be highly variable. To date there have been no measurements made for permeability or porosity of sediments. Figure 3-3 shows a table of typical values for permeability and hydraulic conductivity for various unconsolidated sediments and bedrock units (Freeze and Cherry, 1979). Until specific values can be determined from on-site testing, the table can be used as a guide for characterization of aquifer or aquiclude properties. Cores recovered from borings SBH-1, 2, and 3 within the tank farm contained numerous plant root cavities running to depths of greater than 20 feet, and may serve to significantly enhance the vertical permeability of the clay/silt beneath the site.

3.5 GROUND WATER MONITORING SYSTEM

Eleven monitoring wells have been drilled around the ISC facility. A map showing well locations is on Plate 2-3. Two wells (EPA-R-1, EPA-R-3) were installed by the U.S. Environmental Protection Agency (USEPA) in August, 1986. Nine wells, including three

Unfractured		Froc Basait	lured	
Unfractured	· Sa	Fractured andstone		Lava flow
Shale	Fractured	Semiconsolid	atedi	
Unfractured	Fractured	Car	bonate Rocks	
	Frecti	silt, Loess		Cavernous
		S	iity Sand	
			Clean Sand	
	Glacial Till		Fine Co	Gravel
0 - 5 : 10 - 7 10 - 5	10-5 10-4 10-	10-2 10-1 m d-1	1 10	10 2 10 3 10 4
10 ⁻⁷ 10 ⁻⁶ 10	-5 10 ⁻⁴ 10 ⁻³		10 10	² i0 ³ 10 ⁴ 10
10 ⁻⁶ 10 ⁻⁵ 10	0-4 10-3 10-2	10-1 1	0 10 2 10	3 10 4 10 5

Figure 13. Hydraulic Conductivity of Selected Rocks

FIGURE 3-3

TYPICAL VALUES FOR HYDRAULIC CONDUCTIVITY

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with two inch diameter PVC casing (PVC-1, 2, and 3), and six wells (MW-1 through 6) with four inch diameter steel casing construction were installed by ISC in October, 1986. A listing of wells and their construction details can be found on Table 3-1. Construction diagrams for the wells are found in Appendix A-2.

A review of the well construction diagrams for the nine wells installed by ISC shows inadequate construction methods and inappropriate materials were used in the wells. Lack of gravel pack in the screened intervals, absence of bentonite seals to isolate the screened interval and use of steel casing among other items, caused concern on the part of both ISC and MDNR that the wells could provide an easy path for any spills or surface contamination to reach the water table beneath the site.

A plan was submitted by ISC to MDNR to plug and abandon the wells. After approval of the plan, the wells were plugged by ISC in January 1992. This was accomplished by using a drill rig to pull the casings out of the ground and backfilling the hole with bentonite grout cement. A copy of the plugging report is included in **Appendix A-3**.

TABLE 3-1
MONITORING WELL CONSTRUCTION SUMMARY

Industrial Service Corporation Kansas City, Missouri

Monitoring Well No.	Date <u>Drilled</u>	Ground Elevation (ft)	Top of Casing (ft)	Depth (ft. below G.L.)	Top of Elev.(ft/MSL)	Screens Depth (ft)	Screen <u>Length (ft)</u>	Construction
EPA-R-1	8-19-86	782 ± (est)		29.5	762.5	19.5	10	2" PVC
EPA-R-2	8-19-86	$782 \pm (est)$		40.0	Well Plugged an	nd Abandoned	i	2" PVC
EPA-R-3	8-19-86	786 ± (est)		48.5	749.5	36.5	. 12	2" PVC
•.								
MW-1	10-11-86	782.24	781.59	30.23	742.01	20.23	10	4" pipe
MW-2	10-12-86	783.61	783.43	25.20	768.41	15.20	10	4" steel pipe
MW-3	10-11-86	784.38	783.93	29.51	763.87	19.51	10	4" steel pipe
MW-4	10-11-86	779.42	780.09	28.44	760.98	18.44	10	4" steel pipe
MW-5	10-11-86	782.69	782.92	26.35	766.34	26.35	10	4" steel pipe
MW-6	10-12-86	784.93	784.72	28.23	766.70	18.23	10	4" steel pipe
· .								
PVC-1	9-20-86	778.79	778.82	23.82	764.97	13.82	10	2" PVC
PVC-2	9-20-86	774.69	775.29	19.48	765.21	9.48	10	2" PVC
PVC-3	9-20-86	782.81	782.56	20.67	772.14	10.67	10 .	2" PVC

⁻⁻⁻ Data Not Available

4.0 PROCESS DESCRIPTION AND TANK SYSTEM

4.1 GENERAL

ISC is a collector, transporter, processor and marketer of specification used fuel oil in accordance with "Hazardous Waste Management System, Used Oil", <u>Federal Register</u>, November 29, 1985.

Used oil is collected from a variety of generators located in the Kansas City vicinity and stored for processing.

The purpose of this facility is to separate the free water which accumulates in waste oil, and to filter/settle out suspended solids which are in waste oil. The processed oil is then sold as a fuel (similar in characteristics to No. 5 fuel oil).

4.2 PROCESS DESCRIPTION

This section describes the status and function of each process unit for this Resource Recovery Facility. As depicted on the process flow diagram on Figure 4-1, there are eight major process steps for the processing of used oil:

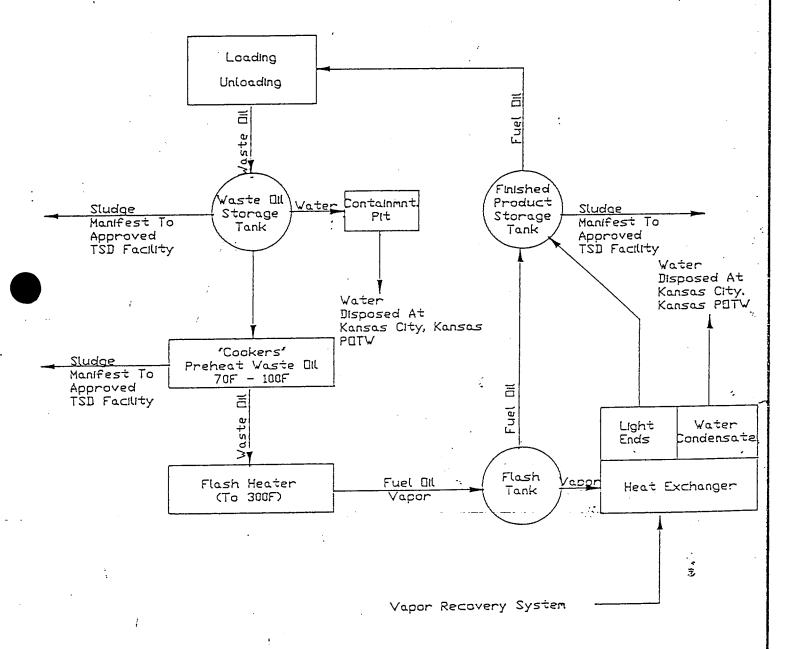
Com	ponent	Operating Status
1)	Loading/Unloading Area	in use
2)	Waste Oil Storage Tanks	in use
3)	Containment Pit	in use
4)	Cookers	in use*
5)	Flash Heater	in use
6)	Flash Tower	in use
7)	Heat Exchanger	in use
8)	Finished Product Storage Tank	in use

^{*} Presently in use for heating of No. 6 oil. Not used as process equipment at this time.

Tank locations and current tank numbering is shown on the 1992 site plan on Plate 2-2. Waste oil is transported to the unloading area where it is pumped to the designated

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Process Flow Sheet



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daily deposit tank (Tank Nos. 1, 2, 3, 4 or 5). These procedures are described in the Quality Control/Waste Analysis Plan of the <u>Resource Recovery Certification RR-004</u> (RRC) for ISC, dated October 1990, a copy of which is found in <u>Appendix A-4</u>.

As described in the RRC, a daily composite sample is collected and analyzed for halogens and PCBs. If the waste oil is acceptable for further processing, the waste oil is pumped to reservoir waste oil storage Tank Nos. 25, 26, 27 or 29, where it is allowed to settle and the oil and water are allowed to separate.

Water which is separated is drained from the tank and is collected in the concrete lined containment pit located at the northwest corner of the facility.

Waste oil in storage Tank Nos. 25, 26, 27 or 29 is transferred to the flash heater and flash tower processing unit. This system is operated at 40 gallons per minute and heats the oil to 265°F. At this temperature, water and light ends are evaporated from the oil. The Vapor Recovery System collects and condenses the water and light end vapors.

Once the waste oil is heated to the above temperature, the processed oil is pumped to Tank No. 28 for storage prior to marketing. Before being transferred to Tank No. 28, the processed oil is mixed with used diesel fuel to reduce its viscosity and lower its flashpoint, which improves the burning characteristics of the oil. Tank No. 28 has a capacity of 103,000 gallons.

ISC produces a specification used fuel oil which has a heating value of at least 135,000 BTU per gallon. The product is marketed as a burnable fuel oil to businesses such as asphalt companies, etc.

4.3 PROCESS EQUIPMENT MAINTENANCE

The following describes service and maintenance that is performed on process equipment:

- 1) <u>Cookers</u> When cookers are used as process equipment, sludge or tank bottoms are cleaned out approximately every 3 months (if required) based on inefficient performance of heat transfer coils.
- 2) <u>Flash Heater</u> The feed pump is replaced or rebuilt approximately once every 9 months.
- 3) Flash Heater coils Coils are replaced approximately once every two years.
- 4) Flash Tower No routine maintenance.
- 5) <u>Electric motors and pumps</u> Lubricated every 6 months, or as required.
- 6) <u>Heat Exchanger</u> No routine maintenance.
- 7) <u>Condensate Tank</u> Water is drained from the tank to the containment pit approximately once per week (or as required). Light ends are added to product which is then transported to customers in tanker trucks.

4.4 VAPOR RECOVERY PROCESS DESCRIPTION

As previously discussed, vapors are condensed and collected from the flash heater and flash tower through the vapor recovery system. A system design sketch is shown on Plate 4-1. The vapor condensate enters the tube side of the heat exchanger and drains into the 13,000 gallon condensate tank. Waste oil from Tank No. 29 is recirculated through the shell side of the heat exchanger for the purpose of heat transfer.

The condensate consists of light ends and water. Water is taken to a POTW. The water is transported to the Kansas City, Kansas Water Pollution Control Department (KCKWPCD) sludge discharge sump pit located at 2nd and Oakland in Kansas City, Kansas. A copy of the agreement between the KCKWPCD and ISC is found in **Appendix A-5**.

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The addition of a carbon filtration unit has been made to pretreat wastewater generated prior to treatment at a POTW. Figure 4-2 shows a schematic of the treatment system.

Wastewater generated onsite originates from one of three sources. The first is rainfall that falls within the containment area. The second source of wastewater generated onsite is from the free water drained from the incoming oil. The third source of wastewater is collected in the condensate storage tank from the heat exchanger. The enclosed flow schematic depicts water flow and treatment through the facility.

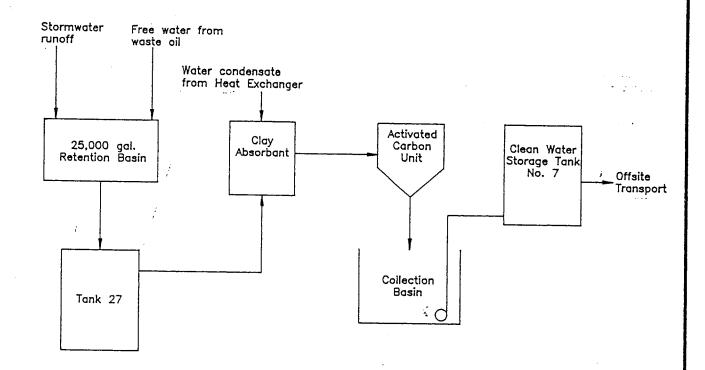
The first two sources of wastewater previously described are collected in 25,000 gallon retention basin located in the northwest corner of the facility and then staged in tank 27. This water is then pumped to a clay absorbent filter and an activated carbon adsorption unit which flows to a small collection basin. A submersible pump with float controls then pumps the treated water to tank 7 which serves as a storage reservoir for treated water. This tank is emptied as necessary by bulk liquid transport vehicle and treated wastewater is disposed of at a POTW.

The third source of wastewater previously described will follow the same treatment scheme. The only exception will be that the water stored in the condensate tank will be pumped directly to the clay absorbent and carbon adsorption unit.

The actual treatment process consists of two unit operations. The first unit is a granular clay absorbent formulation developed for use as a column filtration medium in wastewater treatment. The purpose of the clay absorbent is to remove free and emulsified oil and grease which would otherwise foul the carbon adsorption unit. The clay filters will be managed as hazardous waste when they are exhausted.

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WASTEWATER FLOW SCHEMATIC



The second treatment process is a non-pressure granular activated carbon adsorption unit designed for removal of dissolved organic contaminants from wastewater. Once exhausted, the carbon unit will be sent for reactivation at a permitted facility. The carbon unit will be managed as hazardous waste for regeneration purposes.

4.5 CONTAINMENT PIT

The tank farm containment area was enclosed in 1984 with a four foot high concrete wall with a six foot high chainlink fence enclosing the north and west sides of the processing and storage tank area. The chainlink fence is topped by top posts mounted at a 45 degree angle with three strands of barbed wire.

A containment pit was installed at the northwest corner of the facility in 1984 for the purpose of controlling and collecting storm run-off from the processing and storage tank areas. The concrete lined containment pit has dimensions of 9' wide by 27' long by 12' deep, and a capacity of 25,000 gallons. A diagram of the containment pit is found in Appendix A-6. The pit design included a 12 inch thick watertight concrete floor.

Storm run-off mixes with on-site waste oil (from leaking valves, etc.). These waters are collected in the concrete lined containment pit at the northwest corner of the tank farm. The water is transported to the Kansas City, Kansas Water Pollution Control Department discharge sludge pit at 2nd and Oakland.

At least once a month ISC must bring one truck load of waste water from the pit to the KCKWPCD laboratory for sampling and testing for oil and grease, pH, total suspended solids, COD, BOD, cadmium, chromium, copper, lead, nickel, and zinc. Every six months water samples must be collected from the containment pit and analyzed for Priority Pollutant volatile organic compounds.

Water in the containment pit is currently being treated with a clay filter and activated carbon water treatment unit to remove any volatile constituents in the water prior to transport off site. An oil skimmer also operates in the pit, with skimmings being recovered and placed back into waste oil storage.

4.6 WASTE OIL, HAZARDOUS WASTES, WASTE BY-PRODUCTS

At present, nine storage tanks (Tank Nos. 1, 2, 3, 4, 5, 25, 26, 27, and 29) with a total capacity of 362,800 gallons, are used for waste oil storage on-site. This used oil is defined as hazardous waste by Missouri Regulation 10 CSR 25-11.010. In general, the most significant criteria used for defining waste oil as defined by the regulation are as follows:

- 1. A waste that is or contains one or more of the following derived from petroleums: lubricating oil, transmission oil, transformer oil, hydraulic oil, fuel oil, cutting oil or heavy viscosity oil, provided the waste is not defined or listed by 10 CSR 25-4.261.
- 2. Any synthetic oil used as a substitute for petroleum derived oil as defined in paragraph 1.
- 3. Any mixture of waste oil with nonhazardous waste if the resulting percentage of oil by volume is ten percent (10%) or greater.
- 4. A mixture of waste oil with characteristic ignitable hazardous waste described, but not listed in 10 CSR 25-4.261 if the mixture has a heating value of greater than 5,000 BTU per pound, and if the flash point is at least 140°F.

There are five waste by-products generated by this resource recovery facility. These wastes and the current method of disposal are summarized below:

1. Condensate recovered from the vapor recovery system. These hydrocarbon light ends are added to the processed oil.

- 2. Water recovered from the vapor recovery system. This water is transported to the Kansas City, Kansas Water Pollution Control Department sludge discharge sump pit at 2nd and Oakland, under agreement.
- 3. Sludge collected as bottoms from waste oil storage tanks and cookers. These are tested for BTU content, manifested and transported to the Systech concrete kiln incinerator near Fredonia, Kansas.
- 4. Storm runoff which mixes with on-site waste oil (from leaking valves, etc.). These waters are collected in the concrete lined containment pit at the northwest corner of the tank farm. The water is transported to the Kansas City, Kansas Water Pollution Control Department discharge sludge pit at 2nd and Oakland.
- 5. Skimmings from the concrete lined containment pit. These skimmings are collected and placed back into waste oil storage.

All hazardous waste by-products generated at the facility are taken to an USEPA approved disposal site. These wastes are transported to a facility owned by Systech Corporation in Fredonia, Kansas (EPA No. KSD 980633259), where they are disposed of in a cement kiln. Corporate headquarters for Systech are located in Xenia, Ohio. The company was founded in 1969. The facility in Fredonia opened in 1982.

4.7 TANK FARM DESCRIPTION

The tank farm facility is primarily used for the bulk storage and processing of used oil. Plate 2-2 shows a map of the present tank configuration at the site. Table 4-1 contains a listing of tanks currently within the tank farm, their storage capacities, and their status.

There are eighteen (18) above-ground storage tanks in the tank farm which are in use or capable of being used. Total storage capacity of these tanks is 588,850 gallons. In addition to these, there are an additional four (4) horizontally mounted tanks equipped with steam coils which are used as cookers.

TABLE 4-1

STORAGE TANK INVENTORY INDUSTRIAL SERVICE CORPORATION Kansas City, Missouri

Tank No.	Previous No.	Description	<u>Contents</u>	<u>Status</u>
1 2 3 4 5 6 7 8 9 10 25 26 27 28 29 30 31 32		17,800 gallon vertical tank 16,350 gallon vertical tank 16,350 gallon vertical tank 17,800 gallon vertical tank 22,650 gallon vertical tank 22,650 gallon vertical tank 17,800 gallon vertical tank 16,350 gallon vertical tank 16,350 gallon vertical tank 17,800 gallon vertical tank 25,000 gallon vertical tank 25,000 gallon vertical tank 25,000 gallon vertical tank 25,000 gallon vertical tank 103,200 gallon vertical tank 197,000 gallon vertical tank 197,000 gallon vertical tank 197,000 gallon vertical tank 13,000 gallon vertical tank 10,000 gallon vertical tank	Waste oil composite Truck fuel No. 6 fuel oil No. 6 fuel oil Form/Hyd oil No. 2 fuel oil Waste oil storage Waste oil storage Waste oil storage Processed oil Waste oil storage Waste oil storage Waste oil storage Processed oil Waste oil storage Waste oil storage No. 2 Diesel No. 2 Diesel	In Use
		588,850 GALLON TOTAL CAPACITY	2 220001	Not in Use

Tank No.	Previous No.	<u>Description</u>	Contents	<u>Status</u>
Cooker No. 1	Same	14,100 gallon horizontal tank	Processing oil Processing oil Processing oil Processing oil	In Use
Cooker No. 2	Same	24,350 gallon horizontal tank		In Use
Cooker No. 3	Same	14,100 gallon horizontal tank		In use
Cooker No. 4	Same	14,100 gallon horizontal tank		In use

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Also shown on Plate 2-2 are the present locations of 16 former above ground storage tanks which have been taken off their foundations and are out-of-service. These are stored along the east side of the facility. The out-of-service tanks were emptied and removed from the tank farm at various times between 1984 and 1987. Two tanks (T-11, T-12) are currently located outside the security fence, a result of some tanks being moved because of damage from rocks falling from the cliff behind the facility. These tanks will be moved back inside the secured area at the earliest possible opportunity. Original locations of the tanks as depicted on the Part A Application filed in 1980 are shown on the site plan on Plate 4-2. These tanks are temporarily stored pending testing and final disposition upon approval of this Closure Plan. A listing of tanks from the original Part A application which are no longer in service is found on Table 4-2. The list also shows status of eight tanks which are no longer at the site. A more detailed discussion of status and disposition of these tanks is presented in Section 6.2.

ζ.

TABLE 4-2

TANKS REMOVED FROM SERVICE (March-April, 1987) INDUSTRIAL SERVICE CORPORATION Kansas City, Missouri

Tank No.	<u>Description</u>	Former Contents	<u>Status</u>
T-4 T-5 T-6 T-7 T-8 T-9 T-10 T-11 T-12	8,300 gallon vertical tank 8,500 gallon vertical tank 8,200 gallon vertical tank 11,750 gallon vertical tank 9,500 gallon vertical tank 19,000 gallon vertical tank 19,450 gallon vertical tank 9,300 gallon vertical tank 13,600 gallon vertical tank 13,600 gallon vertical tank	Not used Water/solvent mix Not used Not used Not used Waste Oil Waste Oil Not Used Not Used Not Used Not Used	Dismantled 4/87 Dismantled 4/87 Unknown Unknown Dismantled 4/87 Out of Service Out of Service Out of Service Out of Service Unknown
T-15 T-16A T-16B T-17 T-18 T-21 T-22 T-23 T-24 T-25B T-26 T-27 T-28 T-29	12,100 gallon vertical tank 16,200 gallon vertical tank 8,750 gallon vertical tank 17,100 gallon vertical tank 16,300 gallon vertical tank 15,650 gallon vertical tank 23,000 gallon vertical tank 15,950 gallon vertical tank 10,700 gallon horizontal tank 10,575 gallon vertical tank 11,000 gallon vertical tank 12,450 gallon vertical tank Unknown Capacity 23,317 gallon horizontal tank	Not Used Not Used Kerosene Waste Oil Waste Oil Waste Oil Waste Oil Not Used Kerosene Waste Oil Waste Oil Waste Oil Waste Oil	Out of Service Unknown Dismantled 4/87

Tanks listed above were removed from stable footings in tank farm and moved to on-site storage area outside of tank farm on east side of property. Tanks are being stored on site pending testing and certification that they are clean, as per "fuel" closure requirements.

Original site plan also shows 2 vertical storage tanks of unknown capacity to be Not in Use.

All tanks are steel.

5.0 PAST ACTIVITIES AND SITE INVESTIGATIONS

5.1 INTRODUCTION

During the 34 years of waste oil collection and reprocessing at this facility, leaking process lines, spills and other occurrences have allowed hydrocarbons and other contaminants to enter the soils and ground water beneath the site. Some of these have migrated off site. Waste characterization was accomplished by utilization and interpretation of data gathered from soil borings and monitoring wells drilled on and near the property.

5.2 MDNR INSPECTION, NOTICE OF VIOLATION, JANUARY 29,1988

A site inspection was performed by representatives of MDNR and Radium Petroleum on December 22, 1987. The purpose of the inspection was to determine the status of the tank farm area. During the inspection it was brought to the attention of MDNR that improvements had been made in the area of the tank farm immediately north of the administrative offices and garage and that work on upgrading the middle portion of the tank farm had been started.

A Notice of Violation of 40 CFR 265.112 was issued to Radium Petroleum for commencing closure activities at the site without having submitted an amended plan or notification. A copy of the <u>Report of Investigation</u> and <u>Notice of Violation</u> are included in Appendix A-7. The report contains a summary of work which had been performed by Radium on the tank farm prior to the site investigation, including analytical work associated with contaminated soils at the site. All work pertaining to closure activities at the site was immediately discontinued until such time as a closure plan is approved.

5.3 CLOSURE RELATED ACTIVITIES PRIOR TO JANUARY 1988

The following discussion is a description of Closure related activities and site improvements which took place at ISC prior to the inspection by MDNR on December 22, 1987.

5.3.1 <u>Description of Field Activities</u>

Originally, plans had called for contaminated soils inside the tank farm to be excavated and a concrete floor installed before tanks were placed back in the area in a two phase operation:

- 1. Phase 1 included removal of Tank Nos. T-4, T-5, T-8, T-11, T-12, T-14, T-15, T-16A, T16B, T-26, and T-27, an area covering approximately the south third of the tank farm.
- 2. Phase 2 comprised the middle third of the tank farm including removal of Tank Nos. T-9, T-10, T-11, T-17, T-18, T-19, T-20, T-21, T-22, T-23, T-24, T-25A, and T-25B.

Plate 5-1 shows outlines of the Phase 1 and Phase 2 areas, as well as locations of the storage tanks prior to the start of facility modifications in early 1987. Tables 4-1 and 4-2 indicate the present disposition of these tanks. Tanks removed were emptied, and resulting tank bottom wastes were transported to the Systech, Inc. cement kiln at Fredonia, Kansas for incineration. Tank Nos. T-4, T-5, T-8, and T-29 were cut up and destroyed. Tank Nos. T-14, T-19, T-20, and T-25A were placed in their present position and renumbered (Tank Nos. 31, 5, 6, and 32, respectively) as indicated on Plate 2-2.

As the tanks were removed, all contaminated soils and gravel were excavated and disposed of at the Johnson County Landfill, Shawnee, Kansas, under special authorization from the Johnson County Environmental Department. A copy of Johnson County Industrial Solid Waste Disposal Authorization Number 87-92 can be found in Appendix A-8. Soils and gravel were removed from the south third of the tank farm, generally to a depth of about 3 feet.

Work in Phase 1 took place during March and April, 1987. While soils were being excavated, a leaking underground pipe was found that had been previously utilized for the

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loading and unloading of trucks. This leaking line was situated near the north wall of the office building. Most of the contaminated soils encountered during excavation of Phase 1 were found to be adjacent to the north wall of the office building. These were identified primarily on the basis of visual inspection and odor.

All contaminated soils were excavated and replaced with compacted clay obtained from the Woods Chapel Landfill, Independence, Missouri. The contaminated soils were disposed of in the Johnson County Landfill by special authorization from the Johnson County (Kansas) Environmental Department, as indicated previously.

During excavation of Phase 1, an underground septic tank was discovered and removed from beneath the present location of composite Tank No. 1. The location where the tank was discovered is shown on Plate 5-1. It is believed this septic tank served as a collection point for the plant septic system. A 4 inch diameter clay pipe emanated from the septic tank at a depth of about four feet below present grade. The outfall of this pipe has not been conclusively determined, but it is believed that the pipe lead to another septic tank which was formerly located beneath the present location of Tank Nos. 25, 26, and 27. That septic tank was removed in 1984, prior to installation of the concrete pad under those tanks. A 4 inch clay pipe had been partially excavated with that tank.

The septic tank removed in March 1987 was found to contain approximately 300 gallons of oil and 1,000 gallons of water. After testing the product, it was removed from the tank and placed into waste oil storage for processing prior to start if excavation. After removal of the septic tank, the excavation was backfilled with compacted clay. Hydraulic oil Tank No. 31 (formerly T-14), which had been located over the septic tank, was moved to its present location in the tank farm on top of concrete footings as shown on Plate 4-1.

5.3.2 Closure Related Soil Samples (March 1987)

On March 31, 1987, samples were taken of soils removed from around the septic tank and Tank No. 31 (formerly T-14). Sampling locations are shown on Plate 2-3. These samples were analyzed only for hazardous waste characteristics. The samples revealed low levels of oil and grease (1.1 to 4.5%), high flash point (195°F+), non-detectable levels of PCB's, and non-hazardous levels of EP Toxicity metals: Barium, 2 to 4 mg/l; Silver, 0.04 mg/l. Copies of individual laboratory results are in Appendix A-9.

5.4 OFF-SITE SOIL BORINGS (December 1987-January 1988)

On December 31, 1987, and January 2, 1988, seven borings were drilled on the Livers Bronze property, 1608 S. Marsh, immediately to the west and northwest of the ISC facility. Four soil samples were collected from two of the borings (TH-2 and TH-3) to determine the nature and extent of contamination which may have moved off-site.

Locations of the borings are shown on Plate 2-3. Boring logs can be found in Appendix A-1. No details are available concerning whether the samples were composited or discrete, or from what depth interval they came. The soil samples were analyzed for volatile organic compounds, total metals, and PCBs. Copies of the analyses are in Appendix A-9. For purposes of this discussion, it is significant to note that volatile organic compounds were detected in samples from both borings. These are listed below:

- 1. Tetrachloroethene
- 2. Toluene
- 3. Ethylbenzene
- 4. Xylenes
- 5. 1,1 Dichloroethane
- 6. Chloroform
- 7. Methylene chloride

5.5 TANK FARM SOIL BORINGS (April 1988)

5.5.1 Description of Field Activities

At the request of MDNR, an investigatory drilling program was undertaken at the ISC facility to determine the type and extent of petroleum contamination in soils beneath the Phase 2 area of the tank farm. On April 5-6, 1988, three borings were drilled, cored and sampled inside the tank farm in the area where storage tanks had been removed. Samples from the borings were split with MDNR. Locations of the borings are shown on Plate 2-3. The borings provided data about subsurface geology beneath the former tank storage area as well as an indication of the extent of soil contamination beneath the facility.

Cores from the soil borings showed evidence of numerous root cavities running vertically from the surface to depths in excess of 20 feet. The cavities, which were from 1/16-1/64 inch in diameter were often coated with oil, and provide a ready path of migration from the ground surface to the water table. The weathered zone found at the contact between the alluvial valley fill and bedrock also provides a potential conduit for migration of contaminants into deeper parts of the valley.

5.5.2 Tank Farm Soil Borings (April 1988)

Eight soil samples were collected from the three borings. The samples were analyzed by Quality Analytical Services, and the results were summarized and reported to MDNR in a letter on July 29, 1988. A summary of results is found in Table 5-1 and copies of the laboratory reports are found in Appendix A-9. To aid in interpretation of results, the following discussion is divided into the main groups: Volatile organic compounds, semi-volatile organic compounds, metals (Total), metals (EP-Tox), pesticides/PCBs, and Appendix VIII Constituents.

TABLE 5-1 (p. 1 of 2)

SUMMARY OF DETECTED COMPOUNDS TANK FARM SOIL BORINGS April 1988

	<u> SBH-1</u>		SBH-2				SBH-3	
Parameter uq/l	3-14"	8-38"	38-68"	68-74"	0-15"	15-72"	72-132"	192-204"
Volatile: (ug/kg)								
Benzene	ND	ND	ND	ND	1,620	ND	ND	ND
1,1 dichloroethene	ND	ND	ND	ND	2,100	ND	ND	ND
Ethylbenzene	977	364	250	105	16,300	ND	115	ND
Tetrachloroethene	905	ND	ND	ND	116,000	ND	ND	ND
Toluene	800	679	396	127	48,000	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	37,600	ND	ND	ND
Xylenes 1	6,400 1	10,400	5,000	1,870	574,000	1,150	3,160	321
Pesticide: (ug/kg)								
Gamma-BHC	130	ND	10	ND	ND	ND	ND	ND
Heptachlor	310	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	ИD	ND	ИD	ND	1,605	ND	ND	ND
Herbicide: (ug/l)								
2,4-D	ND	ND	\sim ND	ND	31	ND	ND	<24
2,4,5-TP (Silvex)	ND	33	ND	ND	ND	ND	ND	ND
PCB Aroclor-1260	ND	ND	ND	ND	ND	670	570	250

TABLE 5-1 (p.2 of 2)

SUMMARY OF DETECTED COMPOUNDS TANK FARM SOIL BORINGS April 1988

	8BH-1		SBH-2			81	3H-3	
Parameter mg/kg	3-14"	8-38"	38-68"	68-74"	0-15"	15-72"	72-132"	192-204"
Total Metals: (mg	/kg)							
Antimony	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	13.2	15.3	15.3	12.1	2.7	17.6	17.2	13.2
Barium	226	310	219	199	51	249	226	276
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	4.3	3.0	2.8	3.0	1.0	2.1	2.6	2.5
Chromium	17.5	13.5	14.9	14.3	19.2	14.1	11.4	13.8
Lead	438	16.5	25.8	48.6	611	29.3	55.2	17.3
Mercury	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ИD	ND	ND	ND
Silver	ИD	ND	ND	ND	ИD	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	119	53	49	69	214	44	44	57
Metal(EP-Tox):(mg	/1)		es.					
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND
Barium	2.13	0.63	1.06	1.33	0.66	0.28	0.15	0.210
Cadmium	0.008	0.003	0.008	0.009	ND	ND	ND	ND
Chromium	ND	ND	ND	ND	ND	ND	ND	ND
Lead	0.088	ND	ND	ND	0.029	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	0.004	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND

Volatile Organic Compounds

Volatile organic compounds (VOCs) were detected in all eight soil boring samples. The largest number of VOCs (7) and the highest observed concentrations of these VOCs were found in one sample from Boring SBH-3 (0-15"). These VOCs and their respective levels were: 1,1 dichloroethene (2,100 ug/kg); trichloroethene (37,600 ug/kg.); benzene (1,620 ug/kg.); tetrachloroethene (116,000 ug/kg.); toluene (48,000 ug/kg.); ethylbenzene (16,300 ug/kg.); and total xylenes, (574,000 ug/kg). A summary of detected VOCs is found on Table 5-1.

Semi-volatile Organic Compounds (BNAs)

Eight samples from soil borings were analyzed for semi-volatile organic compounds (BNAs). No compounds were found to exceed detection limits in any of the samples. Analytical results and detection limits can be found on the laboratory reports found in Appendix A-9.

Priority Pollutant Metals (Total)

Seven soil samples were analyzed for Priority Pollutants metals (total) concentrations. One sample (SBH-2; 8-38") was analyzed for metals on the Appendix VIII List, and will be discussed later in this section. Metals were detected in all samples collected. Results are summarized on Table 5-1.

For comparative purposes, Table 5-2 is a table showing background concentration values for each metal as found in Missouri soils. In general, detected concentrations for barium and chromium are at levels considered to be background. Arsenic and cadmium concentrations are slightly elevated in all samples, but are probably background for the area. Additional sampling may be necessary to confirm this.

Elevated concentrations for both lead and zinc were found in sample SBH-1; 3-14" (lead 438 mg/kg; zinc 119 mg/kg), and in SBH-3; 0-15" (lead 611 mg/kg; zinc 214 mg/kg). Two additional samples may contain elevated concentrations of lead: SBH-2;68-74" contained 48.6 mg/kg; and SBH-3;6-11' contained 55.2 mg/kg.

Table 2.—Average total concentrations of elements in Missouri soils

[Detection ratio is number of samples with detectable concentration to total number analyzed. Geometric mean, geometric deviation, and geometric error given except as noted by asterisk (*) where arithmetic mean, standard deviation, and standard error are given. Mean values and ranges are in parts per million except as noted in percent. Leadered entries (--) mean insufficient data]

					•
Element	Detection	Geometric	Geometric		Geometric
2200000	ratio	mean	deviation	Observed range	error
					······································
Ag	4:1140	<0.7		<0.7 - 3	
Al, pct	1140:1140		1.19*	1.1 - 7.9	0.34*
As	1140:1140	8.7	1.46	2.5 - 72	1.16
В	1113:1140	31	1.34	<20 - 700	1.40
Ва	1140:1140	580	1.46	100 - 1500	1.28
Be	520:1140	0.8	1.43	<1 - 2	1.16
C (as total), pct	1140:1140	1.30	17.50	0.24 - 5.2	1.07
C (as carbonate) pct-	946:1140	0.028	2.85	<0.01 - 2.9	2.31
C (as organic) pct	1140:1140	1.25	1.53	0.08 - 5.2	1.11
Ca, pcc	1114:1140	0.33	2.03	<0.07 - 5.6	1.12
ca, pec-	1114.1140	17.33	2.00	(11.11) = 310	1.12
Cd	12:1140	<1		<1 - 11	
Ce	435:1140	115	1.27	<150 - 300	
Co	1139:1140	10	1.50	<3 - 30	1.27
C	1140:1140	54	1.44	10 - 150	1.27
Cu	1140:1140	13	1.55	5 - 150	1.28
F	1140:1140	270	2.22	10 - 6400	1.86
	1140:1140	2.11*	0.64*	0.49 - 5.4	0.12*
Fe, pct	1111:1140	11	1.49	(5 - 30	1.22
Нд	1124:1140	0.039	1.80	<.01 - 0.8	1.53
I	114:114	4.4*	1.65*	1.2 - 11.7	0.65*
1	114.114	4.4 ···	1.05	1.2 - 11.7	0,00
K, pct	1140:1140	1.4*	0.40*	² 0.33 - 3.7	0.07*
La	1136:1140	41	1.39	<30 - 150	1.26
Li	1140:1140	22	1.28	7 - 47	1.05
Mg, pct	1140:1140	0.26	1.65	0.05 - 2.8	1.10
Mn	1140:1140	740	1.83	15 - 3000	1.30
W-	16.11/4	. 22		<3 - 15	
Mo	16:1140	<3	~ ~ ~ ~ ~		0.03+
Na, pct	1140:1140	0.53*	0.23*	0.07 - 1.2	0.03*
Np	375:1140	7.2	1.38	<10 - 15	1.11
Nd	739:1140	63	_ 1.17	<70 - 150	
Ni	1131:1140	14	1.59	<5 - 70	1.24
P, pcc	1130:1140	0.059	1.61	<.01 - 0.61	1.30
Pb	1140:1140	20	1.55	10 - 7000	1.22
Sc	1092:1140	7.6	1.34	<5 - 15	1.16
Se	925:1140	0.28	2.54	<0.1 - 2.7	1.67
Si, pct	1140:1140	35*	2.77*	23 - 43	1.32*
Sn======	0.11/0	415		co	
	9:1140	<15		<15 - 50 '	, ,,
Sr	1140:1140	110	1.50	20 - 500	1.25
Th	199:228	9.6*	2.47*	3.2 - 21	2.29*
Ti	1140:1140	3300	1.31	1500 - 7000	1.20
U	228:228	3.8	1.34	1.1 - 15	1.26
V	1140:1140	69	1.50	15 - 150	1.25
Y	1138:1140	32	1.35	<10 - 70	1.25
Yb	1138:1140	3.2	1.31	<1 - 7	1.25
Zn	1140:1140	49	1.55	18 - 640	1.08
Z _T	1140:1140	310	1.53	70 - 700	1.35
		J 1 · ·	,,	100	

Source: U.S.G.S., 1984. Geochemical

Priority Pollutant Metals (EP-Toxicity)

Eight soil samples were analyzed for Priority Pollutant Metals (EP-Toxicity). Barium was detected in all samples (maximum concentration - 2.13 mg/l). Cadmium was detected in four samples (max. concentration - 0.009 mg/l). Lead was found in two samples (max. concentration - 0.088 mg/l). Selenium was detected in one sample (0.004 mg/l). Results are summarized on Table 5-1.

Pesticides/PCBs, Herbicides

Eight soil samples were analyzed for the USEPA CLP -Exhibit D List Pesticides/PCBs plus two herbicides (2,4-D and 2,4,5-TP Silvex). Six compounds from the list were detected in the samples. 2,4-D was detected in two samples (max. concentration - 31.0 ug/kg). Silvex was detected in two samples (max. concentration - 33.0 ug/l). Gamma-BHC was detected in one sample (130 ug/kg); heptachlor epoxide in one sample (1,605 ug/kg); and heptachlor in one sample (31 ug/kg). Arochlor 1260 was detected in four samples (max. concentration - 670 ug/kg). A summary table is shown on Table 5-1.

Appendix VIII Constituents

One soil sample (SBH-2; 8-38") was analyzed for the Appendix VIII constituents. A copy of the laboratory report is found in **Appendix A-9**.

5.6 GROUND WATER SAMPLING ACTIVITIES

5.6.1 On-site Monitoring

As previously discussed, eleven ground water monitoring wells have been installed at or near the ISC facility. Of those, nine were installed by ISC. Well locations were shown on Plate 2-3.

Ground water sampling has occurred on an infrequent basis since the wells were installed. One set of four samples was taken from the wells in November 1987. The only other record of sampling occurred in January 1992, immediately prior to abandonment and plugging of the wells.

SUMMARY OF DETECTED COMPOUNDS GROUND WATER MONITORING WELLS

November 1987

TABLE 5-3

Well Number:	<u>MW-2</u>	<u>MW-3</u>	<u>MW-4</u>	<u>MW-5</u>
<pre>Volatile: (ug/L)</pre>				
Benzene	56.3	23.6	65.2	64.9
1,1 dichloroethane	8.5	9.0	8.7	18.6
1,1 dichloroethene	12.2	11.0	15.5	24.3
Methylene Chloride	34.2	54.1	23.3	19.8
1,1,2,2 Tetrachloroethane	8.9	ND	ND	ND
Toluene	98.5	78.5	132	119
1,1,1 Trichloroethane	5.4	6.9	19.7	19.0
Trichloroethene	12.5	6.1	24.4	22.1
Vinyl Chloride	23.1	ND	ND	23.1
<pre>Metals(total): (mg/L)</pre>				
Arsenic	0.05	0.14	0.06	ND
Barium	0.6	0.8	1.7	1.1
Chromium	0.020	0.020	0.020	0.020
Lead	0.04	0.3	0.3	0.4
Zinc	0.10	0.06	0.18	0.32

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Due to the inadequate materials and methods used in construction of the nine wells (MW-1 through 6, PVC-1 through 3) installed by ISC, any currently available analytical results are not suitable to fully evaluate ground water contamination beneath the site. The results, however, are adequate to give a preliminary indication of what kinds of contaminants are present.

Ground Water Samples - November 1987

A summary of compounds detected in the four water samples taken in November 1987 is shown in Table 5-3. Laboratory reports are found in Appendix A-10. The samples were analyzed for volatile organics, BNAs, and metals (total).

Seven volatile organic compounds (benzene, 1,1-dichloroethane, 1,1-dichloroethene, methylene chloride, toluene, 1,1,1-trichloroethane, trichloroethene) were found in each of the four samples, one (vinyl chloride) was found in two of the four samples, and one (1,1,2,2-tetrachloroethane) was detected in one sample.

Out of fourteen metals analyzed for, five were detected in the samples. Barium, chromium, lead, and zinc were detected in all four samples. Arsenic was detected in three out of four. For comparison, a listing of generalized background concentrations for metals and other selected parameters in ground water is found on Table 5-4.

Ground Water Samples - January 1992

Prior to abandonment of the wells, the wells were checked to see if there were any fluids in the casing. If fluids were present an attempt was made to obtain samples for analytical purposes. Water samples were collected from wells MW-4 and MW-5, and one oil sample was collected from well MW-2. The other wells were either dry of silted up. The wells were not bailed prior to sampling, however, the results still give an indication of contamination present in the wells. A summary of detected compounds is found in Table 5-5. Laboratory reports for the samples are found in Appendix A-10. Three volatile organic compounds, nine BNA compounds, one PCB and nine metals were identified in the two samples.

5.6.2 Off-site Ground Water Samples (Livers Bronze)

During off-site drilling activities on the Livers Bronze property in December 1987, two ground water samples were obtained.

TABLE 5-4

TYPICAL LEVELS OF WATER QUALITY VARIABLES

<u>Variable</u>		Gro	und V	Vater
General (mg/L)				
Alkalinity Conductivity (umhos/cm @ 25°C) Hardness Nitrate pH (units) Sulfate TDS		<1000 50 25 0.2 6 3 <1000	-	50,000 300 20 8.5 150
Major Elements (mg/L)				•
Calcium Chloride Fluoride Iron Magnesium Sódium		1 1 0.0 1 0.5	- - - 1 - -	150 70 5 10 50 120
Trace Elements (ug/L)	,			
Antimony Arsenic Barium Beryllium Boron Cadmium Chromium Chromium Cobalt Copper Lead Manganese Mercury Nickel Selenium Silver Thallium Zinc		<1 10 <10 20 <1 <1 <10 <1 <15 1 <10 <5		30 500 1000 5 30 1000 50

WATER QUALITY VARIABLES (Source: Terracon, 1991)

TABLE 5-5 SUMMARY OF DETECTED COMPOUNDS GROUND WATER MONITORING WELLS (JANUARY 1992)

Compound	<u>MW-4</u>	<u>MW-5</u>
<u>Volatiles:</u> Benzene Ethyl benzene Toluene	817 ug/L 297 ug/L 2,200 ug/L	402 ug/L 396 ug/L 2,070 ug/L
BNAs: Acenapthene Anthracene Bis(2-ethylhexyl) phthalate Bis(2-chloroisopropyl) ethe Fluorene Hexachloroethane Napthalene 2,4-Dimethylphenol Phenol	2.	23.4 ug/L 11.3 ug/L 27.3 ug/L ND 36.5 ug/L 46.9 ug/L 253 ug/L 38.6 ug/L ND
PCB-1260	2.48 ug/L	ND
Metals: Arsenic (total) Barium (total) Beryllium (total) Cadmium (total) Chromium (total) Copper (total) Lead (total) Nickel (total) Zinc (total)	0.832 mg/kg 3.59 mg/kg 0.004 mg/kg ND 0.111 mg/kg 0.482 mg/kg 0.732 mg/kg 0.340 mg/kg 2.02 mg/kg	5.39 mg/kg 12.1 mg/kg 0.18 mg/kg 0.014 mg/kg 0.398 mg/kg 2.17 mg/kg 9.62 mg/kg 1.40 mg/kg 8.42 mg/kg

Note: Samples collected in January 1992 were grab samples taken immediately prior to pulling well casings. The wells were not bailed.

One sample each was collected from borings TH-2 and TH-3. Copies of the laboratory reports are found in Appendix A-10. Samples were analyzed for the Priority Pollutant List. In both cases volatile organic compounds were detected. A summary of detected compounds is found in Table 5-6.

5.7 CONTAMINANTS OF CONCERN

Table 5-7 contains a summary listing of organic compounds detected in soil samples and ground water samples taken on and off site.

Assessments of soil contamination at the site will be continued through field activities associated with Interim Status closure activities to discussed in Section 6.

Data concerning ground water contamination at the site is insufficient to make any comparison with established ARARs. The data is sufficient to indicate that contaminants, particularly some volatile organic compounds have moved offsite. Installation of new monitoring wells at the site and subsequent sampling on a periodic basis is needed in order to characterize any ground water contamination problem at the site.

5.8 POTENTIAL MIGRATION PATHWAYS

A preliminary assessment of existing site data has identified potential migration pathways at the site. Because of construction characteristics of the monitoring wells installed by ISC in 1986, the well bores and casings provided a direct vertical conduit for any near surface contamination or free product to enter the alluvial deposits beneath the site. As previously discussed, these borings were plugged during field activities in January 1992.

Similarly, the cores from the soil borings inside the tank farm (SBH-1, 2, 3) showed evidence of numerous root cavities running vertically from the surface to depths in excess

TABLE 5-6

SUMMARY OF DETECTED COMPOUNDS GROUND WATER SAMPLES (Livers Bronze Property) December 1987

Well Number:	<u>TH-2</u>	<u>TH-3</u>
Volatile: (ug/L)		
Acetone	ND	56
Benzene	17	123
Chlorobenzene	ND	13
Chloroethane	ND	254
1,1 dichloroethane	137	706
1,2 dichloroethene	180	76
1,2 dichloroethane	31	31
Ethylbenzene	ND	48
Methylene Chloride	22	27
Tetrachloroethene	ND	6
Toluene	6	19
1,1,1 trichloroethane	18	91
Total Xylenes	27	345
<pre>Metal (total): (mg/L)</pre>		
Arsenic	0.0053	0.0157
Barium	0.41	0.52
Cadmium	0.013	0.005
Calcium	175	171
Chromium	0.021	0.024
Iron	1.063	1.270
Lead	0.11	0.23

TABLE 5-7 SUMMARY OF DETECTED ORGANIC COMPOUNDS INDUSTRIAL SERVICE CORPORATION KANSAS CITY, MISSOURI

	<u>soil</u>	Ground <u>Water</u>
VOLATILES:		
Acetone Benzene Chlorobenzene Chloroethane 1,1-Dichloroethane 1,2-Dichloroethane 1,2-Dichloroethane 1,2-Dichloroethene Ethyl benzene Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethene Toluene 1,1,1-Trichloroethane Trichloroethene Vinyl Chloride	- X - - X - - X - X x - X	X X X X X X X X X X X X
Xylenes BNAs:	X	Х
Acenapthene Anthracene Bis (2 ethylhexyl) phthalate Bis (2-chloroisopropyl) ether 2,4-dimethylphenol Fluorene Hexachloroethane Napthalene Phenol	- - - - - - -	X X X X X X X
PESTICIDES/PCBs: 2,4-D 2,4,5-TP (Silvex) Gamma-BHC Heptachlor Heptachlor epoxide Arochlor-1260	X X X X X	- - - - - X

⁻ Not detected

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of 20 feet. The cavities, which were from 1/16 - 1/64 inch in diameter were often coated with oil, and provide a ready path of migration from the ground surface to the water table. The weathered zone found at the contact between the alluvial valley fill and bedrock also provides a potential conduit for migration of contaminants into deeper parts of the valley.

Once contamination has reached ground water, it can migrate off-site, potentially having an impact on industrial or domestic wells in the vicinity. Little data exists to define ground water flow patterns and characteristics in the site vicinity. Similarly, the potential for long-term contaminant migration from the facility to ground waters has not been fully determined.

6.0 INTERIM STATUS CLOSURE WORK PLAN

6.1 INTRODUCTION

This Plan is designed to conform to the Closure Performance Standards established by the USEPA and MDNR. Specifically, the plan insures that the ISC facility will be closed to the extent necessary to protect human health and the environment. That is, the facility will be closed in a manner which minimizes the need for post-closure care. Post-closure activities will be designed to minimize or eliminate hazards to human health and the environment due to release of hazardous waste.

To implement this philosophy, any hazardous waste encountered will be removed and disposed of at an approved RCRA disposal facility. All waste storage units and processing equipment in which hazardous wastes are known to have been, or may have been managed, will be decontaminated or removed from site. A detailed assessment of soils will be made to determine the extent and characteristics of soil contamination beneath the facility, and to confirm whether cleanup activities undertaken under the south third of the tank farm in April 1987 were successful. A ground water assessment will also be performed to determine the characteristics and extent of contamination beneath the facility.

Present plans for the site are to maintain the facility as a RCRA Resource Recovery facility. Improvements will have to be made in the secondary containment systems at the site to adequately protect the underlying soil from future contamination. Because removal of all contaminated soils may be impractical, closure with waste in place (and the requirement for post-closure care) will be considered. Soil (and ground water) assessments will be designed to consider the feasibility of performing in-situ remediation of the subsurface, capping, or use of other alternatives for post-closure maintenance.

Table 6-1 contains a listing of waste parameters which the ISC facility has been permitted to accept in the past, or which have been detected on and off site in ground water,

TABLE 6-1 WASTE LISTING INDUSTRIAL SERVICE CORPORATION KANSAS CITY, MISSOURI

Group A: Wastes for which ISC has been permitted to manage. From Part A Application (11/17/80), Resource Recovery Certificate (3/31/83). (Per MDNR Comment Letter dated 1/14/92).

Waste Code	<u> Hazardous Constituents Listed</u>
F003	N.A.
F005	Toluene, Methyl ethyl ketone, carbon disulfide, Isobutanol, Pyridine, 2-ethyoxyethanol, Pyridine, Benzene, 2-nitropropane
K048	Hexavalent chromium, Lead
K049	Hexavalent chromium, Lead
K051	Hexavalent chromium, Lead
K052	Lead
D001	Ignitable
D008	Lead

Group B: Constituents detected in soil borings in April 1988.

	Heptachlor
Gamma-BHC (Lindane)	Heptachlor epoxide
Tetrachloroethene	Arochlor-1260
Toluene	2,4-D
Ethyl benzene	1,1-Dichloroethene
Xylene	Trichloroethene
2,4,5-TP (Silvex)	Benzene

Group C: Compounds detected in soils during RCRA Facility Assessment, 1987.

Naphthalene Bis (2-ethylhexl) phthalate	1,1,1 Trichloroethane 1,1-Dichloroethane
Phenanthrene	Trans-1,2-dichlorothene
Pyrene	Methyl Chloride
Chlorobenzene	Copper
1,2-Dichlorobenzene	Zinc

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soils, or other media during previous site investigations. Group A is a listing of those hazardous constituents for which a particular waste code is listed. Group B are those constituents detected in soil borings in April 1988. Group C includes constituents listed in Table 1 of RCRA Facility Assessment, Final Report, Radium Petroleum Company, April 28, 1987. All laboratory analyses for this site will be in accordance with EPA publication SW-846 or equivalent methods.

The following discussion describes in detail efforts to be made by ISC to satisfy the Closure Performance Standard.

6.2 CLOSURE PROCEDURES FOR HAZARDOUS WASTE MANAGEMENT UNITS

6.2.1 Description of Units to be Closed

The Hazardous Waste Management Units selected for closure under this plan are those storage tanks which were listed on the Part A Application submitted to the MDNR in 1980. Tables 4-1 and 4-2 list capacities and present status of all storage tanks at the ISC facility. There are currently 23 tanks remaining on site from the original Part A submittal which are intended for closure. Tanks intended for closure are listed on Table 6-2 and are shown on the Site Plan (Plate 6-1).

As previously discussed, 16 of the tanks are located along the east side of the facility. These tanks were removed from the Phase 2 area of the tank farm in 1987, and are awaiting decontamination before their final disposition is decided. After closure, the tanks will either be returned to service or removed from the site, depending on their condition.

Seven tanks from the original Part A Application are still located inside the tank farm storage area. These are Tank Nos. 5, 6, 25, 26, 27, 31, and 32. Under the old tank numbering system, these were T-19, T-20, T-1, T-2, T-3, T-14, and T-25A, respectively.

TABLE 6-2 LIST OF TANKS, STORAGE CAPACITIES, AND STATUS FOR INTERIM STATUS CLOSURE INDUSTRIAL SERVICE CORPORATION

TANK NO.	CAPACITY (gal.)	STATUS (3/92)	FUTURE USE
Tanks Not In	Use 4/92:		
T-9	19,000	Empty	Processing Tank
T-10	19,450	Empty	Processing Tank
T-11	9,300	Empty	Dismantle
T-12	13,600	Empty	Storage Tank
T-15	12,100	Empty	Kerosene
T-16B	8,750	Empty	Dismantle
T-16A	16,200	Empty	Storage Tank
T-17	17,100	Empty	Storage Tank
T-18	16,300	Empty	Storage Tank
T-21	15,650	Empty	Dismantle
T-22	23,000	Empty	Storage Tank
T-23	15,950	Empty	Storage Tank
T-24	10,700	Empty	Dismantle
T-25B	10,575	Empty	Dismantle
T-26	11,000	Empty	Storage Tank
r-27	12,450	Empty	Storage Tank
	231,125 gal.(Ou	t of Service)	-
Tanks In Sevi	ce (4/92):		
5 (T-19)+	22,650	Waste oil	Storage Tank
6 (T-20)+	22,650	No. 2 Diesel	No. 2 Diesel
27 (T-1)+	25,000	Waste oil	Storage Tank
26 (T-2)+	25,000	Waste oil	Storage Tank
25 (T-3)+	25,000	Waste Oil	Storage Tank
31 (T-14)+	10,000	No. 2 Diesel	Kerosene
32 (T-25Å)	•	No. 2 Diesel	Kerosene
, ,		n Service Capacity)	
Est. Max			
Inventor	y 370,175 gallons		

^{+ (}T-__) denotes previous number designation of tank.

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Eight tanks listed on the original Part A Application are not fully accounted for. Tank Nos. T-4, T-5, T-8, and T-29 are believed to have been steam cleaned, and cut up with welding torches on site for scrap. This activity took place in 1987. Available records indicate that tanks T-4, T-5, and T-8 were never used. Tank T-29 stored waste oil. Tanks T-6, T-7, and T-13, which records also show as not used, are no longer on site and have not been accounted for. The original tank T-28, which stored processed oil, appears to have been replaced about 1984 by the present Tank No. 28 (103,000 gal. capacity). No records have been located concerning the final disposition of Tank T-28. Final disposition of these tanks has not been fully confirmed. Efforts will continue to be made to determine the final disposition of the tanks, as I.S.C. recognizes it responsibility and continued liability for them.

The total capacity of the tanks listed for closure is 370,175 gallons. Capacity of the 8 tanks not accounted for (excluding T-28, unknown capacity) is 69,567 gallons. Total site storage capacity as listed on the 1980 Part A was 506,224 gallons. No record could be found as to the basis for this number.

6.2.2 Tank Closure Procedures

Industrial Service Corporation seeks to close their hazardous waste management units in a manner consistent with standards established by USEPA and MDNR. The following closure performance standards were developed for the hazardous waste inventory at the site at closure, and the various storage areas and processes at the site.

Any hazardous waste which may be encountered on site is the residual byproduct of the ISC process system, as discussed previously in Section 4-6. The predominant waste expected to be encountered will be sediment and sludge buildup in the bottoms of waste oil storage tanks. These tank bottoms will be analyzed for hazardous waste characteristics and BTU content, and will be manifested and transported to a permitted RCRA hazardous waste

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disposal facility. Currently, tank bottoms from this facility are taken to the Systech concrete kiln in Fredonia, Kansas for incineration. Material which has not been characterized is to be sampled and segregated according to chemical composition.

Tanks In Temporary Storage Area

The 16 tanks in temporary storage on the east side of the facility will initially be visually inspected inside to confirm that tank bottom wastes were completely removed. The tanks will then be decontaminated by using a clean solvent rinse (if necessary), followed by high pressure hot water/steam cleaning. Confirmation of decontamination will be by visual inspection and wipe samples (as necessary). Wipe sampling is not considered appropriate for volatiles, but may detect semi-volatiles and metals. Samples of the rinsate from final steam cleaning rinse of each tank will be collected and analyzed for volatiles. Discussion of decontamination procedures, sampling procedures are contained in Sections 4, 5 and 6 of the Quality Assurance Project Plan/Sampling Procedures (QAPP), in Part B of this Plan.

Once the tanks have been certified as non-hazardous, those tanks to be taken permanently out of service will be cut up with a welding torch and taken to a scrap metal recycler. Certificates of Destruction will be obtained for all tanks destroyed. Tanks to be returned to service will be visually inspected for leaks and tested using ultrasonic methods (as necessary) before being reinstalled.

Most of the tanks in the Temporary Tank Storage Area were removed from the center third (Phase 2 Area) of the existing tank farm, which is currently open and capped with gravel. Three borings in the Phase 2 area have indicated the presence of contaminated soils to a depth of at least 11 feet below ground level. A detailed sampling grid will be laid out and borings will be drilled and sampled to bedrock. Samples will be analyzed to determine characteristics and extent of the contamination beneath the area.

A summary of the sampling program and analytical parameters for this closure is found on Table 6-3.

Tanks in Tank Farm

The seven tanks still located in the tank farm will be emptied of waste oil, and tank bottoms removed prior to decontamination. The tanks will be decontaminated one at a time, and waste oil (or other contents) transferred to other on-site storage so as to minimize interruption of daily operation of the facility. The tanks and their appurtenances will be rinsed with a clean solvent material (if necessary), and decontaminated by steam cleaning. Approximately 215 feet of steel pipe connecting Tank No. 5 with No. 27 will be decontaminated by these methods also. Approximately 90 feet of 4" diameter flexible hose being used for flowlines downstream of Tanks 25, 26, and 27 will be replaced. The flex hose will be placed in drums and disposed of at a permitted RCRA facility. Areas between tanks will be decontaminated using conventional coated concrete cleaning methods (steam cleaning, hydroblasting, etc.). Decontamination procedures are discussed in Section 4 and 5 of the QAPP.

Confirmation of decontamination of the tanks will be achieved by visual inspection and wipe samples (as necessary). Wipe sampling is not considered appropriate for volatile organics; however, semi-volatiles and metals may be present in some instances. To determine if the tank secondary containment has maintained its integrity, and to determine the success of contaminated soil removal in 1987 prior to installation of the concrete floor, soil samples from underneath the tank storage area will be collected and analyzed.

Table 6-3 contains a summary of samples and analytical parameters for this activity. Sections 6 and 7 of the QAPP contain discussions of sampling and analytical procedures.

TABLE 6-3 (p.1 of 2) SUMMARY OF SAMPLING PROGRAM INTERIM STATUS CLOSURE INDUSTRIAL SERVICE CORPORATION

TASK	<u>MATRIX</u>	NO. OF SAMPLES	PARAMETERS	DUPL.	FIELD TRIP BLANKS BLANKS
1. Tank Closure:					
Temporary Storage Area (16 Tanks): Wipe Samples	Wipe	16	BNAs, Metals(TCLP), Pest./PCBs	2	1 0
Tank Rinsate Samples	Water	16	Volatiles	2	0 1
Tank Farm Area (7 Tanks): Tank Bottoms	Sludge	6	Volatiles, Metals(TCLP), Haz. Waste Char.	1	0 0
	Sludge	1	Appendix VIII	0	0 0
Wipe Samples	Wipe	, 7	BNAs, Metals(TCLP), Pest./PCBs	1	1 0
Tank Rinsate Samples	Water	7	Volatiles	1	0 1
Secondary Containment Assessment	Concrete	12	Volatiles, BNAs, Metals(TCLP), Pest./PCBs	2	0 0
2. Containment Pit Assessment:					
Water Sample	Water	1	Appendix VIII	0	0 1
Soil Borings(4)	Soil	8	Volatiles, BNAs, Metals (Total,TCLP), Pest./PCBs	1	1 0

TABLE 6-3 (p.2 of 2) SUMMARY OF SAMPLING PROGRAM INTERIM STATUS CLOSURE INDUSTRIAL SERVICE CORPORATION

TASK	<u>MATRIX</u>	NO. OF <u>SAMPLES</u>	PARAMETERS	DUPL.	FIELD BLANKS	TRIP <u>BLANKS</u>
3. <u>Phase 1 Soils Assessment:</u> (12 Borings)	Soil	48	Volatiles, BNAs, Metals(Total, TCLP), Pest./PCBs, TPH	5	2	0
4. <u>Phase 2 Soils Assessment:</u> (17 Borings)	Soil	68	Volatiles, BNAs, Metals(Total,TCLP), Pest./PCBs, TPH	7	3	0
5. <u>Ground Water Monitoring:</u> (Per Quarterly Event)	Water	6	Volatiles, BNAs, Metals(Total, TCLP), Pest./PCBs, TPH	1	0	1

Containment Pit Assessment

To determine whether the containment pit has maintained its integrity, water samples will be collected from the pit and analyzed for the Priority Pollutants. Four soil borings will be made around the sides of the pit and advanced to a depth 5 feet below the bottom of the pit. Two soil samples per boring will be analyzed for the same parameters as the water sample, and results compared for evidence of leakage. Table 6-3 summarizes samples and analytical parameters for this activity.

The pit will also be emptied for the purpose of making a visual inspection for cracks or settling in the floor or any other factor which might contribute to leakage.

6.2.3 Contaminated Soils

Phase 1 Soils Assessment

The Phase 1 Soils Assessment will evaluate soils beneath concrete flooring in the Phase 1 Area in the south third of the tank farm in addition to concrete flooring adjacent to Tank Nos. 25, 26, and 27, and Tank Nos. 31 and 32. This task will confirm that contaminated soils were replaced in these areas prior to installation of the new concrete flooring, the depth of the fill material, whether native soils beneath the fill are contaminated or not, and whether the secondary containment installed in 1987 has maintained its integrity.

After decontamination of the tanks and surrounding areas has occurred, twelve borings will be advanced through the concrete floor at locations shown on Plate 6-1. Upon drilling through the concrete floor, concrete samples will be collected for confirmation of decontamination procedures. Soil samples will be collected in the intervals 0-6" and 6-12" beneath the concrete to evaluate integrity of the concrete containment. The borings will then be advanced to auger refusal with discrete samples being collected every two feet. Duplicates will be collected for 10% of all samples. All sampling equipment will be appropriately

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decontaminated between each use. The working end of the drilling rig will be steam cleaned between borings.

Samples will be placed in appropriately cleaned containers, labels and chain-of-custody sheets filled out. The samples will be transported to Quality Analytical Services for analysis. Samples will be analyzed for volatile organics, semi-volatile organics (BNAs), Priority Pollutant metals, TCLP Metals, Pesticides/PCBs, and Total Petroleum Hydrocarbons. Table 6-3 contains a summary of samples and analytical parameters. Drilling, sampling, and analytical procedures are discussed in Sections 5, 6, and 7 of the QAPP.

Phase 2 Soils Assessment

Results of the 1988 investigation show that a wedge of contaminated soils in which total BTEX exceeds 1.0 ppm exists beneath the Phase 2 area. Borings SBH-1 and 2, which were drilled to bedrock refusal, found all soils above the bedrock contact to exceed 1.0 ppm BTEX. Boring SBH-3, on the west side of the area was drilled to a depth of 26 feet without encountering bedrock. Results of analyses from SBH-3 samples showed that BTEX levels exceeded 1.0 ppm to a depth of 132 inches (11 feet).

In order to fully characterize the extent and volume of contaminated soils beneath Phase II, the following procedure will be used to collect samples which will be used to establish appropriate levels of decontamination to satisfy the Closure Performance Standard:

* A systematic grid system will be laid out on a site map of the Phase 2 containment area. Grid squares will measure 15 feet on a side. Proposed boring locations are shown on Plate 6-2. Two additional borings will be drilled on an undisturbed property immediately north of the containment area and one boring will be drilled on an undisturbed location south of the facility in order to establish background conditions.

APPENDIX A-1

BORING LOGS

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Starting in June, 1992, wells GW-1, GW-2, GW-3, GW-4, EPA-R-1, and EPA-R-3, will be sampled on a quarterly (March, June, September, December) basis. Wells will be sampled in accordance with procedures outlined in the QAPP. The samples will be analyzed for volatiles, BNAs, Priority Pollutant (Total) Metals, TCLP Metals, and pesticides/PCBs.

8.3 SOIL GAS SURVEY

Upon completion of initial development and sampling of the four monitoring wells being installed in March-April 1992 and the two EPA wells, analytical data will be used to propose parameters to be used in conducting a soil gas survey. The survey should assist in defining boundaries of the contaminant plume leaving the site and help in determining locations for installation of additional monitoring wells and soil borings for off-site assessments.

8.4 SOIL CONTAMINATION ASSESSMENT

8.4.1 On-site Soil Contamination

Rebuilding the surface concrete containment and installing the proposed clay cap and HDPE liner for the Phase 2 area will help mitigate any further vertical migration of contaminants left beneath that area after......??. The Phase 1 and Phase 2 soil contamination assessments described in Section 6.2.3 will provide data to perform a feasibility study to determine whether contaminated soils left on site can be remediated on-site or whether some form of containment or cap will have to be designed for future maintenance of the site after the facility is closed.

8.4.2 Off-site Soil Contamination

Borings drilled for installation of new monitoring wells are to be sampled at discrete two foot intervals to characterize and evaluate soil contamination around the outside perimeter of the tank farm containment area. Analytical data from these activities will be

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8.5.2 Post-Closure Costs Estimate

Third Party costs associated with the task listed in the previous section are as follows:

1.	Site Inspections (Quarterly) Assumptions: 4 hr inspection x 4 inspections/yr x \$80.00 hr	\$	1,280.00/yr
2.	Groundwater Monitoring (Quarterly) Assumptions: 2 persons x 8 hrs x 4 sets/yr x \$45/hr 6 wells + 1 duplicate x 4 sets/yr x \$1000/sample	\$ \$	2,880.00 28,000.00/yr
3.	Operate, maintain leak detection system for Phase 2 area Assumptions: 1 person x 15 min/week x \$30/hr x 52 wks	\$	390.00/yr
4.	Periodic repair, maintenance of concrete secondary containment area <u>Assumptions</u> : Contingency for repairs - LUMP SUM	\$	5,000.00/yr
POST	\$	37,550.00	

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- * Borings will be drilled at the center of each grid to bedrock. The borings will be drilled using hollow stem augers and continuously sampled using wireline equipment. Discrete soil samples will be collected every 2 feet. The working end of the drill rig will be decontaminated between each boring and sampling equipment will be decontaminated between each use. Drilling and sampling procedures are presented in Sections 5 and 6 of the QAPP. Composite samples of drill cuttings will be collected for each boring and analyzed for Hazardous Waste Characteristics prior to any excavation activity.
- * Samples will transported to QAS, where they will be analyzed for volatile organics, BNAs, Priority Pollutant Metals, TCLP metals, pesticides/PCBs, and for Total Petroleum Hydrocarbons (EPA Method 418.1). Samples and analytical parameters are shown on Table 6-3. Analytical methods are summarized in Section 7 of the QAPP.

Excavation and removal of contaminated soils will continue to a depth at which analytical results from sampling show total BTEX levels less than 1 ppm and TPH less than 10 ppm in any given sampling grid square or other cleanup level as agreed upon with MDNR. Any soils left in place which are known to be contaminated, but at levels below the above guidelines will be addressed during ensuing investigations relating to post-closure activities. Excavations will be curtailed if the bedrock surface is encountered, since potential for bedrock contamination will also be addressed during post-closure investigations. Using geologic and analytical data from the three soil borings, it is currently estimated that there will be approximately 1,050 yd³ of contaminated soils to be removed from the Phase 2 area.

Contaminated soils will be transported and disposed of at an appropriate sanitary landfill after obtaining any necessary special waste authorizations. Any soils exhibiting hazardous characteristics will be placed in lined, covered roll-off containers which will be stored in a secure area on site. A treatability study will be performed to determine the suitability of the soils for on-site treatment by aerobic pile bioremediation and/or solidification processes, after which the soils can either remain on site, or be disposed of at a sanitary landfill.

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Once appropriate levels of decontamination of the soil in the Phase 2 area have been agreed upon, clean clay material will be hauled from off-site and compacted in-place to form a base for a 6 inch reinforced concrete pad as constructed over Phase 1. In the event that soils with above background concentrations of contaminants are left in place, proper notation will be made on the property title in accordance with State law, as described in Section 5.0 of this document. Once soil assessments are finished, a feasibility study will be proposed to consider possible alternatives for in-situ remediation of contaminated soils.

Installation of Concrete Floor over Phase 2

Fill will be an approved low volume change material, free of organic matter and debris. Fill will be placed in lifts not exceeding 9 inches in loose thickness. Fill that will support lightly loaded floor slabs will be compacted to at least 95 percent but not more than 100 percent of standard Proctor density (ASTM D-698). All fill should be placed, compacted and maintained at moisture contents 0 to 4 percent above the optimum value determined by the standard Proctor test.

Samples of materials proposed for use as fill on the site will be submitted to a geotechnical laboratory well in advance of construction so Standard Proctor, Atterberg Limits and grain size analysis tests can be performed. We recommend a geotechnical engineer be retained to monitor fill placement on the project and to perform field density tests as each lift is placed in order to evaluate compliance with the design requirements.

Once the clay fill has been placed and adequately compacted to a permeability of 10⁻⁶ cm/sec², and prior to placement of the reinforced concrete floor, a 30 mil thick high strength, chemical resistant HDPE geotextile liner will be installed over the clay cap in order to help insure that hydrocarbons or other contaminants will not be able to migrate downward into the underlying clays should the concrete floor ever become breeched in the future. Before pouring the concrete floor a 6" thick layer of coarse gravel drainage layer and geosynthetic

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filter will be placed on top of the HDPE/clay liner. A 12 inch diameter PVC capped riser pipe will be installed at the low end of the liner to monitor for leakage into the drainage layer. A schematic showing the proposed composite liner design is on Figure 6-1. Final design of the lined clay cap and concrete floor will be overseen and approved by an engineer registered in the State of Missouri before installation.

6.2.4 Disposal of Contaminated Soils, Drill Cuttings

Any drill cuttings and contaminated soils recovered during drilling operations will be placed in lined drums and stored on site. The materials in the drums will be sampled and analyzed for RCRA Hazardous Waste Characteristics and TCLP volatiles and metals. Once it has been determined whether the waste is hazardous or non-hazardous, the materials will be disposed of in a manner consistent with Federal and State guidelines and regulations.

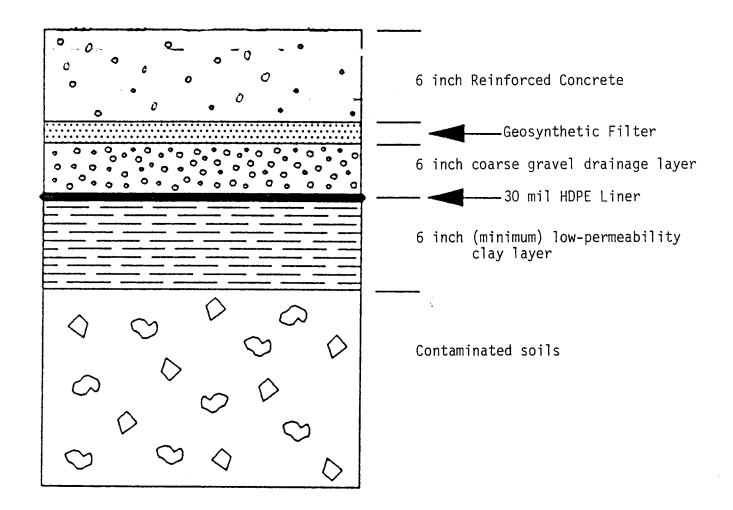
6.3 MAXIMUM INVENTORY OF HAZARDOUS WASTE

It has been previously discussed that the Total Maximum Inventory of waste oil which could be stored in the 23 steel-welded storage tanks to be closed is 362,225 gallons. This quantity represents less processed oil than is produced in a month at the ISC facility. As shown in Table 6-2, 16 of the 23 tanks are empty and have not been in service since 1987. The total capacity of the seven tanks which are still in use is 131,100 gallons. Of the seven tanks to be closed in the tank farm, four (Nos. 5, 25, 26, 27) are currently being used for waste oil storage. Total capacity of these four tanks is 97,650 gallons. Any waste water drained off these tanks will be run through the onsite treatment system (clay filter, carbon filter) and disposed of in accordance with present onsite waste water disposal practices as described in Section 4. Waste oil inventory in the tanks will be retested according to standards of acceptance for allowing waste oil into the facility, and then if acceptable, transferred to other onsite storage. Tank bottom sludges typically make up about 10% of the tank volume, or 9,765 gallons. There will be no need to transport any of the waste oil or

FIGURE 6-1

PROPOSED CAP DESIGN FOR PHASE 2 AREA

Industrial Service Corporation Kansas City, Missouri



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diesel fuel inventory from these tanks to off-site locations since the waste oil inventory from these tanks can be transferred to other on-site tank storage.

6.4 RESIDUAL WASTE REMOVAL FROM TANKS AND DECONTAMINATION PROCEDURES

6.4.1 Tank Bottom Sludge (heavy oil)

All tank bottom sludges encountered during closure procedures on the 23 tanks will be manifested, transported to, and disposed of at a permitted RCRA Hazardous Waste Facility (ie., cement-kiln incinerator or other facility).

6.4.2 Decontamination or Disposal of Equipment

All materials subject to exposure to hazardous wastes will be decontaminated if possible. If decontamination is impractical, the material will be removed and disposed of at a permitted RCRA facility. The success of any decontamination efforts will be judged by either visual inspection, rinsate analysis (for non-porous materials such as metal equipment and structures) or sample verification (for concrete or soils). Since some of the primary constituents of concern are volatile organic compounds, wipe sampling for VOC's is not considered appropriate to assess residual contamination of non-porous surfaces in many instances. Rinsate samples will be collected and analyzed for VOC's where appropriate.

All reusable sampling equipment will be decontaminated between sampling locations. Cleaning will consist of scrubbing to remove encrusted materials followed by alconox and water wash and potable water rinse using hot water. All decontamination fluids will be collected and handled as discussed in Section 6.2.4. Following decontamination, the clean equipment will be stored on plastic sheeting. This equipment will be covered with plastic.

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6.5 SCHEDULE FOR CLOSURE

The proposed schedule for closure follows on Table 6-4. ISC could initiate the closure of the Phase 2 area and tanks immediately after the Interim Status Closure Plan is approved.

6.6 NOTICE IN DEED AND OTHER NOTIFICATIONS

If ISC certifies a closure which does not result in the removal of waste to background levels, ISC will record, in accordance with state law, a notation on an instrument which is normally examined during title search that will in perpetuity notify any potential purchaser of the property that the land had been used to manage hazardous waste. If background levels are not attained, ISC will submit a notarized statement to the Department certifying that ISC has caused the notation to be recorded on the deed to the facility property. The notation shall be recorded with the Recorder of Deeds in Jackson County, Missouri. A notarized certification and a copy of the document page containing the notation will be provided to the EPA Region VII Administrator and the MDNR Hazardous Waste Program RCRA Permits Unit Chief.

7.0 COST ESTIMATE AND CERTIFICATION OF INTERIM STATUS CLOSURE

The cost estimate for conducting an Interim Status closure of the ISC facility under worst possible circumstances is \$601,920.30. The closure costs are summarized by activity illustrated in Table 7-1. This Interim Status Closure Estimate is based upon a third party closure of the site to reflect the worst possible cost. The closure cost estimate will be adjusted annually (within 30 days of the anniversary of the first Interim Status Closure Cost Estimate 4/5/91) to reflect changes in closure costs brought about by inflation. The Department of Commerce's implicit price deflator for Gross National Product will be used to make this statement. The latest adjusted cost estimate will be retained with the Interim Status Closure Plan throughout the life of the facility. Each revision will be signed and dated by a responsible company official, documenting the date of review and/or revision. The most current Closure document will be available for review of regulatory officials upon request. The Closure Cost Estimate was based on "Means Construction Cost Data", direct contact with contractors and disposal facilities operators, and in-house engineering cost estimates.

7.1 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE

Industrial Service Corporation will provide a Surety Bond guaranteeing payment into a Closure Trust Fund for the amount of the Closure estimate. The surety company issuing this Surety Bond is authorized to do business in the State of Missouri.

7.2 CERTIFICATION OF CLOSURE

At the completion of the closure activities, the complete facility closure will be certified by an independent professional engineer registered in the State of Missouri. B & V Waste Science and Technologies (BVWST), Kansas City Missouri, has been retained for the purpose of reviewing documents and work plans for closure related activities. Representatives of the BVWST will be present at the site to oversee closure and decontamination activities. Certification of Closure will take place within 60 days of the final closure. Records of the certification will be included in the closure documentation.



INDUSTRIAL SERVICE CORPORATION PROPOSED CLOSURE SCHEDULE

			1	1ON	NTH	1	N	10N	TH	2		MC	NT	H 3	N	101	ITH	4	M	ON	TH	5	М	ON7	ГН 6	7
CLO	SURE A	ACTIVITY	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C.	Temp	orary Tank Storage Area Closure																								
	1.	Disposal of Maximum Hazardous Waste Inventory (not applicable)																								
	2.	Tank Decontamination, analytical work												Χ	Х	Χ										
	3.	Tank Dismantling or Testing														Χ	χ									
D.	Closur	re of Tanks in Tank Farm																								
	1.	Disposal of Maximum Hazardous Waste Inventory														Χ	Χ	Χ	x							
	2.	Tank and Appurtenance Decontamination Analytical Work																Х	X	Χ	Χ	Х				
	3.	Tank Testing		٠.											į					Χ	Χ	Χ	Χ	χ		
	4.	Decontamination of Tank Storage Area																		Χ	Χ	χ				
E.	Phase	I Soils Assessment																								
	1.	Soil Borings																			Χ	Х				
	2.	Analytical Work																			Χ	Х				
G.	Closur	re Certification																								
	1.	On-Site Supervision	Х	Χ	Χ	χ	Х	Χ	Χ	Х	Χ	Χ	Χ	Х	χ	Χ	Χ	Χ	Х	Χ	Χ	х				
	2.	Closure Report																					Χ	ХХ	(X	

TABLE 7-1

INTERIM STATUS CLOSURE COST ESTIMATE SUMMARY
Industrial Service Corporation - KCMO

				AMOUNT	UNITS	UNIT COST	TOTAL COST	SOURCE
A.	Phas	e 2 Soil	Assessment & Soil Removal					
	1.	Soil I	Borings/Core	19	Boring	400.00	7,600.00	Α
	2.	Analy	rtical Work	76	Sample	1,000.00	76,000.00	В
	3.	Excav	vate Contaminated Soils	1050	Yd³	6.29	6,600.00	В
	4.	Treat	Soils On-Site and Disposal:					
		a.	Treatment (Biological)	1575	Ton	70.00	110,250.00	A
		b.	Transportation	1050	Yd³	8.00	8,400.00	Α
		c.	Disposal fee (sanitary landfill)	1575	Ton	30.00	47,250.00	Α
	5.	Backi	fill, compaction of soils:					
		a.	Clean Backfill Material (delivered)	1750	Yd³	14.00	24,500.00	Α
		b.	Compaction and Labor	1750	Yd³	3.80	6,650.00	Α
		c.	Geotechnical Testing		Lump Sum	5,000.00	5,000.00	А, В
	6.	Instal	l Liner	4200	Ft ²	0.30	1,260.00	A, B
	7.	Instal	l Concrete Floor (6")	467	Yd²	26.00	12,142.00	Α
Phas	se 2 Soil	l Assessn	nent and Soil Removal (subtotal)			SUB-TOTAL	305,652.52	•

Note: A - Engineering Estimate

TABLE 7-1

INTERIM STATUS CLOSURE COST ESTIMATE SUMMARY Industrial Service Corporation - KCMO

			AMOUNT	UNITS	UNIT COST	TOTAL COST	SOURCE
В.	Cont	ainment Pit Evaluation					
	1.	Soil Borings	4	Boring	400.00	1,600.00	Α
	2.	Analytical Work (9 soils, 1 water)	10	Sample	1,000.00	10,000.00	В
	3.	Install HDPE Liner	1	Lump Sum	3,500.00	3,500.00	Α
Conta	inment	t Pit Evaluation (subtotal)			SUB-TOTAL	15,100.00	

Note: A - Engineering Estimate



INTERIM STATUS CLOSURE COST ESTIMATE SUMMARY Industrial Service Corporation - KCMO

				AMOUNT	UNITS	UNIT COST	TOTAL COST	SOURCE
C.	Temp	orary T	Tank Storage Area Closure:					
	1.	_	osal of Maximum Hazardous Waste ntory				TANKS ARE EMPTY	
	2.	Tank	Decontamination:					
		a.	Tank Cleaning	16	Tank	2,000.00	32,000.00	A, B
		ъ.	Tank Dismantling and Disposal	5	Tank	700.00	3,500.00	Α
		c.	Tank Inspection and Testing (for tanks to be reused)	11	Tank	300.00	18,000.00	A, B
		d.	Analytical Work	18	Sample	1,000.00	18,000.00	В
Temp	orary 1	Cank Sto	orage Area Closure (subtotal)	9° .		SUB-TOTAL	56,800.00	

Note: A - Engineering Estimate

TABLE 7-1 INTERIM STATUS CLOSURE COST ESTIMATE SUMMARY Industrial Service Corporation - KCMO

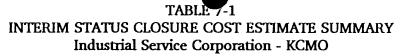
					AMOUNT	UNITS	UNIT COST	TOTAL COST	SOURCE
D.	Clos	ure of T	anks in	Tank Farm					
	1.		osal of N e Invent	Maximum Hazardous tory:					
		a.	Trans	sportation to RCRA Facility	500	Loaded Mile	3.25	1,625.00	A
		b.	Incin	eration of Bulk Material	9765	Gallons	0.03	293.00	Α
	2.	Tank	and Ap	purtenance Decontamination	:				
		a.	Tank	Cleaning	7	Tank	4,000.00	28,000.00	A, B
		ъ.	Analy	rtical Testing	8	Sample	1,000.00	8,000.00	В
		c.		Testing asonic or hydrostatic)	7	Tank	300.00	2,100.00	А, В
	3.	Deco	ontamina	ation of Tank Storage Area:	g*- ,				
		a.		rete Surface Treatment an crew)					
			1.	Mobilization/Setup	48	Man Hour	30.00	1,440.00	Α
			2.	Equipment Rental	10	Days	165.00	1,650.00	Α
			3.	Hydroblast Floors	240	Man Hour	30.00	7,200.00	·A
			4.	Transport of Solids to RCRA Facility	250	Loaded Mile	3.25	813.00	Α
			5.	Transport Decon Liquids	1000	Loaded Mile	3.25	3,250.00	A

TABLE 7-1

INTERIM STATUS CLOSURE COST ESTIMATE SUMMARY
Industrial Service Corporation - KCMO

			AMOUNT	UNITS	UNIT COST	TOTAL COST	SOURCE
							· · · · · ·
E.	Phase	I Soils Assessment					
	1.	Soil Borings	12	Boring	400.00	4,800.00	A, B
	2.	Analytical	53	Sample	1,000.00	53,000.00	В
Phase	I Soils	Assessment (subtotal)			SUB-TOTAL	57,800.00	

Note: A - Engineering Estimate



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				AMOUNT	UNITS	UNIT COST	TOTAL COST	SOURCE
D.	Closure of T	'anks ii	n Tank Farm (Continued)					
		6.	Solids Disposal by Incineration	6	Drum	400.00	2,400.00	Α
		7.	Liquids Disposal at RCRA Facility	20,000	Gallon	0.50	10,000.00	Α
	b.	_	oling and Analysis of Concre an crew)	te				
		1.	Concrete Borings	15	Boring	135.00	2,025.00	A, B
		2.	Collect, Analyze Concrete Samples	17	Samples	1,000.00	17,000.00	А, В
	٠	3.	Collect, Analyze Underlying Soils	26	Samples	1,000.00	26,000.00	А, В
Closu	ıre of Tanks ir	ı Tank	Farm (subtotal)			SUB-TOTAL	111,821.00	

Note: A - Engineering Estimate

8.0 POST-CLOSURE INVESTIGATION AND CARE AND MAINTENANCE

8.1 INTRODUCTION

Since a release of hazardous constituents was found off-site from the Industrial Service Corporation facility during a RCRA Facility Assessment Survey, USEPA began implementing a Corrective Action as stipulated in the Hazardous and Solid Waste Amendments of 1984 (HSWA), Section 3004 (u). The phased approach for implementing the Corrective Action provisions consists of a RCRA Facility Assessment Study, RCRA Facility Investigation (RFI), and Implementation of Corrective Measures.

8.2 GROUND WATER MONITORING

8.2.1 Introduction

Little data exists concerning the characteristics of groundwater directly beneath the area to be closed. Monitoring wells installed at the site in 1986 were found to be inadequate in construction design and material, and were subsequently removed and plugged in January 1992. Samples from the wells were adequate enough to indicate the presence of ground water contamination beneath the facility.

8.2.2 Ground Water Monitoring Plan

As part of closure related activities, a new ground water monitoring well installation plan was submitted to and approved by MDNR in January 1992. A copy of the well installation plan and MDNR comments are found in **Appendix A-11**. Four new wells were installed during March-April 1992.

Using a phased approach, Closure and Post-Closure care will address the installation of additional wells upgradient and downgradient of key areas of the ISC facility. That investigation will provide characterization of contaminated groundwater around or under the facility. This data will be used to develop an overall solution for remediation of the facility.



TABLE 7-1

INTERIM STATUS CLOSURE COST ESTIMATE SUMMARY Industrial Service Corporation - KCMO

			AMOUNT	UNITS	UNIT COST	TOTAL COST	SOURCE
G.	Closu	re Certification					
	1.	On-Site Supervision	360	Hour	80.00	28,800.00	Α
	2.	Closure Report		Lump Sum	10,000.00	10,000.00	Α
Closu	re Certi	ification (subtotal)			SUB-TOTAL	38,800.00	
SUBT	OTAL (OF CLOSURE COSTS FOR FACILITY			SUB-TOTAL	547,173.00	
Conti	ngency	(10%)				54,717.30	
тот	AL CO	OST OF CLOSURE (INTERIM STATU	JS) FOR FA	CILITY		\$ 601,920.30	

Note: A - Engineering Estimate

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used to help determine parameters to be used for a soil gas survey, as discussed in Section 8.3.

Using data from the monitoring well borings, soil gas survey, and soil sampling data from past activities, a shallow soil sampling grid will be designed to characterize and quantify the extent of contaminated soils off-site. This data will also be used in conducting feasibility studies for determination of remediation alternatives for the facility.

8.5 POST-CLOSURE CARE AND MAINTENANCE

8.5.1 General

As previously stated, I.S.C. intends to maintain this facility as a RCRA resource recovery facility for the foreseeable future after closure of Interim Status. Site maintenance activities after closure of Interim Status will consist of the following:

- 1. Periodic site inspections (quarterly) by designated persons to inspect conditions of the site.
- 2. Quarterly groundwater monitoring to be initiated in June 1992 will continue through the life of the operating facility and into the post-closure period after the facility is closed.
- 3. Operate and maintain a passive leak detection system to monitor for leakage through concrete floor into drainage layer above HDPE liner. Leak detection system will consist of capped 12" PVC riser pipe through concrete floor at downgradient side of capped area. Hydrocarbon detection will be accomplished by visual examination and sniffing riser with HNu, OVA, or similar hydrocarbon detection equipment.
- 4. Periodic repair and maintenance of concrete floor of secondary containment area.



INDUSTRIAL SERVICE CORPORATION PROPOSED CLOSURE SCHEDULE

	<u> </u>		М	ON	ITH	1	М	ON	TH	2	MC	NT	H 3	М	TNO	H 4	M	ON"	TH 5	5	MC	NTF	1 6
<u>CLO</u>	SURE .	ACTIVITY	1	2	3	4	1	2	3	4	1 :	2 3	3 4	1	2	3 4	1	2	3	4	1	2	3 4
A.	Phase	2 Soil Assessment & Soil Removal																					
	1.	Soil Boring/Core	Х	Χ																			
	2.	Analytical Work			Χ	χ	Х	Χ	Χ														
	3.	Excavate Contaminated Soils								Χ													
	4.	Transport Soils								Χ													
	5.	Backfill, Compaction of Soils									х												
	6.	Install Liner		٠, ٠,							X	,											
	7.	Install Concrete Floor										X											
В.	Conta	inment Pit Evaluation																					
	1.	Soil Borings & Containment Pit Sample	х																				
	2.	Analytical Work	Х	Χ	Χ	Χ								<u>.</u>									
	3.	Install Liner				Χ																	



KANSAS CITY TESTING LABORATORT

FOUNDATION TESTS FOR:

TEST BORING LOG

ECOLOGY AND ENVIRONMENT, INC.

Building Site: RADIUM PETROLEUM MONITORING WELLS

Location: KANSAS CITY, MISSOURI

Date: 8-19-86

Boring No.: R-1

Location: SEE SKETCH

Scale: 1 inch = 3 feet

page	ľ	οf	2
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 Elevation	Depth in Feet	Description	No. of Blows	Depth Inches
_	0.0_	BASE ROCK	-	
<u> </u>	1.0_	BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC		
			1 / 2 _	
	5.0_	PENETRATION TEST SAME MATERIAL	5	12
	6.5_	SAME MATERIAL	·	`
	-			
	10.0_	PENETRATION TEST SAME MATERIAL	9	12
	11.5	SAME MATERIAL		
	13.0	BROWN MOTTLED OLIVE-BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC		
<u> </u>	15.0_	PENETRATION TEST OLIVE-GRAY-BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC	13	12
	16.5	SAME MATERIAL		
				,
	20 · 0			



MANSAS CITY TESTING LABORATORY

FOUNDATION TESTS FOR

TEST BORING LOG

ECOLOGY AND ENVIRONMENT, INC.

Building Site: RADIUM PETROLEUM MONITORING WELLS

KANSAS CITY, MISSOURI Location:

Date: 8-19-86

Boring No .:

R-1

Location: SEE SKETCH

Scale: 1 inch = 3 feet

page	2	of	2
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Log	Elevation	Depth in Feet	· Description	No. of Blows	Depth Inche
	_	_20.0_	PENETRATION TEST OLIVE-GRAY-BROWN SILTY CLAY MOIST, STIFF, PLASTIC	10	12
	_	21.5_	SAME MATERIAL WITH TRACE OF SAND ENCOUNTERED FREE WATER AT 21.5 FEET		
	_	25·0_	OLIVE-GRAY-BROWN SILTY, SANDY CLAY MOIST, SOFT		
		-29.5-	TERMINATION OF BORING		4
,					
					,



KANSAS LITY TESTING LABORATORY

FOUNDATION TESTS FOR:

TEST BORING LOG

ECOLOGY AND ENVIRONMENT, INC.

Building Site: RADIUM PETROLEUM MONITORING WELLS

Location: KANSAS CITY, MISSOURI

Date: 8-19-86

Boring No.: R-2

page 1 of 2

Location: SEE SKETCH Scale: 1 inch = 3 feet

Log	Elevation	Depth in Feet	Description	No. of Blows	Depth Inches
		1.0_	LIGHT BROWN SILTY CLAY WITH GRAVEL MOIST, MEDIUM, PLASTIC		
			BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC		
	_	5.0_	PENETRATION TEST SAME MATERIAL	7	12
		6.5_	SAME MATERIAL		
	_	10.0	PENETRATION TEST SAME MATERIAL	5	12
			SAME MATERIAL		
[[]]] []][]] []][]]	_	_13.0_	OLIVE-GRAY SILTY CLAY MOIST, MEDIUM, PLASTIC		
	_	_15.0_	PENETRATION TEST SAME MATERIAL	6	12
		16.5	SAME MATERIAL		,
<u> </u>		_20.0_			



KANSAS CITY LESTING LABORATORY

FOUNDATION TESTS FOR:

ECOLOGY AND ENVIRONMENT, INC.

Location: SEE SKETCH

TEST BORING LOG

Building Site: RADIUM PETROLEUM MONITORING WELLS

Location:

KANSAS CITY, MISSOURI

R-2 Boring No .:

page 2 of 2

8-19-86

Scale: 1 inch = 3 feet

Log	Elevation	Depth in Feet	Description	No. of Blows	Dept! Inche
	_	20.0	PENETRATION TEST OLIVE-GRAY SILTY CLAY MOIST MEDIUM, PLASTIC	6	12
	_	21.5_	SAME MATERIAL		
	_	25.0_	PENETRATION TEST SAME MATERIAL	6	12
	-	26.5_	`		
		33.5	SAME MATERIAL		
		40.0	OLIVE-GRAY WEATHERED SHALE DRY, STIFF		
•			TERMINATION OF BORING		

BORING DRY UPON COMPLETION



KANSAS CITY TESTING LABORATORY

FOUNDATION TESTS FOR:

TEST BORING LOG

ECOLOGY AND ENVIRONMENT, INC.

Building Site:

RADIUM PETROLEUM MONITORING WELLS

Location:

KANSAS CITY, MISSOURI

Date:

8-20-86

Boring No .:

R-3

Location: SEE SKETCH

Scale: 1 inch = 3 feet

page 1 of 3

Log	Elevation	Depth in Feet	Description	No. of Blows	Depth Inches
		0.0_	BROWN SILTY CLAY WITH VEGETATION AND GRAVEL MOIST, MEDIUM, PLASTIC		
		3.0_			
		5.0	BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC		
		6.5	PENETRATION TEST SAME MATERIAL .	11	12
			SAME MATERIAL		
		10.0	PENETRATION TEST SAME MATERIAL	44	12
		11.5_	SAME MATERIAL		
		13.0_	LIGHT BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC		
		18.0	SAME MATERIAL		• * *
		20.0	·		

INDIANUAL DITTE THE CACHAI



FOUNDATION TESTS FOR:

TEST BORING LOG

ECOLOGY AND ENVIRONMENT, INC.

Building Site: RADIUM PETROLEUM MONTIORING WELLS

Location: KANSAS CITY, MISSOURI

Date: 8-20-86

Boring No.: R-3 page 2 of 3

Location: SEE SKETCH Scale: 1 inch = 3 feet

Log	Elevation	Depth in Feet	Description	No. of Blows	Dept: Inche
	_	20.0	PENETRATION TEST LIGHT BROWN MOTTLED RUST, GRAY SILTY CLAY MOIST, MEDIUM, PLASTIC	10	12
		21.5	SAME MATERIAL		
	_	25.0_	PENETRATION TEST SAME MATERIAL		
	_	26 · 5_	SAME MATERIAL		
		33.0	GRAY-BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC		
		40.0			:



KANSAS CITY LESTING LABORATORY

FOUNDATION TESTS FOR:

TEST BORING LOG

ECOLOGY AND ENVIRONMENT, INC.

Building Site: RADIUM PETROLEUM MONTORING WELLS

Location:

KANSAS CITY, MISSOURI

Date: 8-20-86

Boring No .:

R-3page 3 of 3 Location: SEE SKETCH

Scale: 1 inch = 3 feet

Log	Elevation	Depth in Feet	Description	No. of Blows	Depth Inches
		40.0_	GRAY-BROWN SILTY CLAY MOIST, MEDIUM, PLASTIC		
		45·0_ 46·5_	BROKEN ROCK WITH CLAY SEAMS TERMINATION OF BORING TRACE OF WATER UPON COMPLETION		
·					

MONITORING WELL SOIL BORING INFORMATION FOR MONITORING WELLS

MW-1, MW-2, MW-3, MW-4, MW-5 AND MW-6

MW-1

MW-4

<u></u>			
Install	ed 10-11-86	Install	ed 10-11-86
2'-15' 15'-20'	unconsolidated fill, limestone, gravel brown, silty clay lt. brown silty clay clayer silt, lt. brown	1-5' 5-15'	gravel topsoil reddish clay firm gray clay
<u>MW-2</u>		<u>MW-5</u>	
Installe	ed 10-12-86	Install	ed 10-11-86
0-2' 2'-15' 16-21'	, ,	5-10'	topsoil
<u>MW-3</u>		<u>MW-6</u>	
Installe	ed 10-11-86	Installe	ed 10-12-86
	unconsolidated fill limestone, gravel brown silty clay lt. brown silty clay	3-15'	topsoil red clay shale gray clay, firm

rekson's Missourt SW & SW & SE & Section Number Township Number 149 lit	graphon and hole)
und sirection from nearest town or city street address of well if located within city? de Livers 'Property, 8' east of west N-S fence and 7.0' west of £4 corner of concrete de Livers 'Property, 8' east of west N-S fence and 7.0' west of £4 corner of concrete de Livers 'Property, 8' east of west N-S fence and 7.0' west of £4 corner of concrete de Livers 'Property, 8' east of west N-S fence and 7.0' west of £4 corner of concrete de Livers 'Property, 8' east of west N-S fence and 7.0' west of £4 corner of concrete de Livers 'Property, 8' east of west N-S fence and 7.0' west of £4 corner of concrete de Livers 'Property, 8' east of west N-S fence and 7.0' west of £4 corner of concrete if a 1.2 corner of concrete if a 1	grand below) below) fill mole was s peed
de Livers 'Property, 8' east of west N-S fence and 7.0' west of SM corner of concrete WILLES Radium Petroleum Company, Inc. Livers Property Test Hole #Th Kansas City, Missouri 64126 EWELLE CCATION WITH A DEPTH OF COMPLETED WELL 77.0. Depth(s) Groundwater Encountered 1. 14. 1. 2. 36. 1. 3. Depth(s) Groundwater Encountered 1. 1. 2. 3. Depth(s) Groundwater Encountered 1. 1. 3. Depth(s	grand below) below) fill mole was s peed
Kansa's City, Missouri 64126 Kansa's City, Missouri 64126 EWELLS CCATION WITH IN SCOTION BOX Depth(s) Groundwater Encountered 1, 14, 1t, 2, 36, 1t, 3 Depth(s) Groundwater Encountered 1, 14, 1t, 2, 36, 1t, 3 WELL'S STATIC WATER LEVEL IN C. L'EALERIft, below land surface measured on moldaylyr Pump lest data: Well water was 1t, after hours pumping Est. Yield. 15, gpm: Well water was 1t, after hours pumping Bore Hole Diameter 1, 5, in, to 77, 1t, and in, to WELL WATER TO BE USED AS: 6 Public water supply 8 Air conditioning 11 Injection well 1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify 2 Imrigation 4 Industrial 7 Lawn and garden only 10 Observation well 1 Lest hole. 2 Imrigation 4 Industrial 7 Lawn and garden only 10 Observation well 1 Lest hole. 2 Imrigation 4 Industrial 7 Lawn and garden only 10 Observation well 1 Lest hole. 2 Imrigation 8 Concrete tile CASING JOINTS: Glued Clampo water was 1 the control of the	grown below) fill makes supper suppe
Kansa's City, Missouri 64126 EWELLE CCATION WITH DEPTH OF COMPLETED WELL 77.0 ft. ELEVATION: 765.01 ms1 Depth(a) Groundwater Encountered 1.4 ft. 2 36 ft. 3 Depth(a) Groundwater Encountered 1.4 ft. 2 36 ft. 3 WELL'S STATIC WATER LEVEL 10. L. talkent, below land surface measured on moldaylyr Pump lest data: Well water was ft. after hours pumping Bore Hole Diameter:	below) fil mple was s ped an hole)
EXECUTE CONTION WITH 4 DEPTH OF COMPLETED WELL 77.0 ft. ELEVATION: 765,01 ms1 N SECTION BOX Depth(s) Groundwater Encountered 1, 14, ft. 2, 36, ft. 3, WELL'S STATIC WATER LEVEL IND t. talt-Enft. below land surface measured on moldaylyr Pump lest data: Well water was ft. after hours pumping Bore Hole Diameter 5, 6, in. to 77, ft., and in. to ft., Dia in. to 77, ft., and In. to ft., Dia in. to 77, ft., and in. to ft., Dia in. to ft., Dia ft. Yes, moldaylyr sam mitted was a chemical/bacteriological sample submitted to Department? Yes No if yes, moldaylyr sam mitted was a chemical/bacteriological sample submitted to Department? Yes No if yes, moldaylyr sam mitted was chemical/bacteriological sample submitted to Department? Yes No if yes, moldaylyr sam mitted was chemical/bacteriological sample submitted to Department? Yes No if yes, moldaylyr sam mitted was chemical/bacteriological sample submitted to Department? Yes No if yes, moldaylyr sam mitted Yes No if yes, moldaylyr sam mitted Yes No Yes No if yes, moldaylyr sam mitted Yes No Yes No Yes No Yes No Yes Yes No Yes No Yes	below) ii I mple was s ped an hole)
Depth(s) Groundwater Encountered 1. 1.4 t. 2. 36 t. 3 WELL'S STATIC WATER LEVEL IDC. Lakenft, below land surface measured on mo/day/yr Pump lest data: Well water was t. t. after hours pumping Est. Yield 1. 15, gpm: Well water was t. t. after hours pumping Est. Yield 1. 15, gpm: Well water was t. t. after hours pumping Est. Yield 1. 15, gpm: Well water was t. t. after hours pumping WELL WATER TO BE USED As: 6 Public water supply 8 Air conditioning 11 Injection well 1 Domestic 3 Feedict 6 Oil field water supply 9 Dewatering 12 Other (Specify t. 2 Inrigation 4 Inclustrial 7 Law and garden only 10 Observation well t.est. hole. Was a chemical/bacteriological sample submitted to Department? Yes No	below) / below) // I mple was s pped an hole)
WELL'S STATIC WATER LEVEL IJO C., L'alicent, below land surface measured on moldatyly? Pump lest data: Well water was ft. after hours pumping Bore Hole Diameter (1.6). In. to	below) / below) // I mple was s pped an hole)
Pump test data: Well water was ft. after hours pumping Est. Yield 15, gpm: Well water was tt. after hours pumping Best. Yield 15, gpm: Well water was tt. after hours pumping Best. Yield 15, gpm: Well water was tt. after hours pumping Best. Yield 15, gpm: Well water was tt. after hours pumping Best. Yield 15, gpm: Well water supply 8 Air conditioning 11 Injection well 12 Other (Specify to 2 Irrigation 4 Inclustrial 7 Lawn and garden only 10 Observation well test. No. 12 Irrigation 2 Irrigation 4 Inclustrial 7 Lawn and garden only 10 Observation well test. No. 15 If yes, mol/daylyr sammitted was a chemical/bacteriological sample submitted to Department? Yes. No. 15 If yes, mol/daylyr sammitted 13 RMP (SR) 6 Asbestos-Cament 9 Other (specify below) Welded Cashing diameter 15 In to 15 In to 16 In t	below) #I mple was s ped an hole)
Est. Yield 15. gpm: Well water was ft. after hours pumping hours pum	below) #I mple was s ped an hole)
Bore Hole Diameter 6. fi. in. to 77. fit., and in. to WELL WATER TO BE USED AS: 5 Public water supply 9 Dewatering 11 Injection well 1 Domestic 3 Feedot 6 Oil field water supply 9 Dewatering 12 Other (Specify) 1 Vas a chemical/bacteriological sample submitted to Department? Yes. No it yes, mor/dayly sam mitted 1 Nas a chemical/bacteriological sample submitted to Department? Yes. No it yes, mor/dayly sam mitted 1 Nas a chemical/bacteriological sample submitted to Department? Yes. No it yes, mor/dayly sam mitted 1 Nas a chemical/bacteriological sample submitted to Department? Yes. No it yes, mor/dayly sam mitted 1 Nas a chemical/bacteriological sample submitted to Department? Yes. No it yes, mor/dayly sam mitted 1 Nas a chemical/bacteriological sample submitted to Department? Yes. No it yes not yet yes No it yes not yes	below) if I inple was s inped an hole)
WELL WATER TO BE USED AS: 6 Public water supply 8 Air conditioning 11 Injection well 12 Other (Specify to 12 Impation 4 Industrial 7 Lawn and garden only 10 Observation well 12 Other (Specify to 13 February) 12 Impation 4 Industrial 7 Lawn and garden only 10 Observation well 12 Other (Specify to 14 No) 10 Other (Specify to 15 No) 11 Injection well 12 Other (Specify to 15 No) 12 Impation 13 RMP (SR) 13 RMP (SR) 14 Absolution 15 February 15 RMP (SR) 15 Wrought iron 15 Wrought iron 16 Asbestos-Cement 17 PVC 10 Asbestos-Cement 18 Casing Joints: Glued 16 Campaign 17 RMP (SR) 18 Asbestos-Cement 19 Other (specify below) 10 Other (specify below) 10 Other (specify below) 11 Other (specify) 12 Other (specify) 13 Other (specify) 14 Other (specify) 15 Other (speci	below) #I mple was s pped
1 Domestic 3 Feedlot 6 Oil fleid water supply 9 Dewatering 12 Other (Specify to 15 to 15 to 16 t	pelow) // Delow) // Imple was s ped
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Observation well test hole was a chemical/bacteriological sample submitted to Department? Yes No If yes, mo/day/yr sample with was a chemical/bacteriological sample submitted to Department? Yes No No If yes, mo/day/yr sample water Well Disinfected? Yes No No OF BLAC CASING JOINTS: Glued Clample of Asbestos-Cement 9 Other (specify below) Welded Disinfected? Yes No No OF BLAC CASING JOINTS: Glued Clample of Asbestos-Cement 9 Other (specify below) Welded Disinfected? Yes No No OF BLAC CASING JOINTS: Glued Clample of Casing Joint Signature of Casing Joint Signat	#I mple was s) uped
mitted water Well Disinfected? Yes No Mater Well Disinfected?	nple was s
Mater Well Disinfected? Yes No	ped
Stand Stan	en hole)
Threaded.	en hole)
In. to ft., Dia in. The ft. to ft., Dia in. The ft., Dia in. The ft., Dia in. The ft., Dia in. The ft., Dia in. Dia in	en hole)
SCREEN UR PERFORATION MATERIAL: of a Stainless steel steel steel steel seel steel seel s	en hole)
CREEN UR PERFORATION MATERIAL: 1	en hole)
Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify)	en hole)
4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole) R PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open intinuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes Vered shutter 4 Key punched 7 Torch cut 10 Other (specify) ERFORATED INTERVALS: From ft. to ft., From ft., F	en hole)
OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open nationus slot 3 Mill slot 6 Wire wrapped 9 Drilled holes Vered shutter 4 Key punched 7 Torch cut 10 Other (specify) ER ATED INTERVALS: From. ft. to ft., From ft. to RAY L PACK INTERVALS: From. ft. to ft., From ft. to RAY L PACK INTERVALS: From. ft. to ft., From ft. to MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other als: From. 40 ft. to 0 ft., From ft. to nearest source of possible contamination: 10 Livestock pens 14 Abandoned water of the contamination of th	
### Attenuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes Vered shutter 4 Key punched 7 Torch cut 10 Other (specify)	
Vered shutter 4 Key punched 7 Torch cut 10 Other (specify) ER ATED INTERVALS: From. ft. to ft., From ft. to From. ft. to ft., From ft. to ft. to RAY L PACK INTERVALS: From. ft. to ft., From ft. to Prom ft. to ft., From ft. to ft. to MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other als: From. 40 ft. to ft., From ft. to nearest source of possible contamination: 10 Livestock pens 14 Abandoned water of the property	
## ATED INTERVALS: From. ft. to ft., From ft., From	
From. It. to	
From ft. to ft., From ft. to MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other rais: From. 40 ft. to 0 ft., From ft., From ft. to nearest source of possible contamination: 10 Livestock pens 14 Abandoned water of the property of	
From ft. to ft., From ft. to MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other als: From 40 ft. to 0 ft., From ft. to nearest source of possible contamination: 10 Livestock pens 14 Abandoned water of the property of the p	
als: From40 ft. to ft. from ft.	
nearest source of possible contamination: 10 Livestock pens 11 Abandoned water of tic tank 12 Lateral lines 13 Oil well/Gas well	
tic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 15 Oil well/Gas well	
	-
artight source lines. & Connece sit	
m well? east How many feet? 300	
TO LITHOLOGIC LOG FROM TO LITHOLOGIC LOG	
l gravel fill material with grav silty clay saturate	ted
4 clay, silty, dk.brn. moist loess much water - clear - clear	~
windblown deposits Alluvial deposit Blue River	
14 clay, silty, brown, moist loess 40 59 sand, light gray, with gray s	silt
windblown deposits - Pleistocene and some coarse gravels satur	
some H ₂ O coming from hole clean - Alluvial deposits	
clear K ₂ O 59 74 saturated sandy, gravels and	urated
bourders washed subangular to	urated
moist to wet - loess - windblown angular much water Pleistocene deposits 74 77 shale dk gray hard bedrock	urated
26 Jacobs deposits /4 // shale, dk, gray, hard bedrock	irated
36 clay, silty, sticky moist to wet T.D. 77' - plugged hole back with pebbles - mottled brown to after it collasped from 40' t	irated
gray - Alluvial fill deposits of surface	irated
Blue River - Pleistocene	irated
sand, gray - very, very fine grained	irated
	irated i co.
TH'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed (2) reconstructed of (3) plunged index my juriediction.	irated i tq tk
(moday/year) December 29, 1987 and this record is true to the best of my knowledge and belief.	irated itq ik to
This OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed.)(2) reconstructed, or (3) plugged under my jurisdiction (mo/day/year). December 29, 1987	irated itq ik to

	WELL	Fraction	2M1/4 OT	í	Jec.,,,,,,,,,						
a de la companya de l	on - Missouri	SW v		SE 1/4	6	T	49N	<u> </u>	│ R	32	XXW
d direc	tion from nearest town	or city street a	address of well if loca	ted within ci	ty?	,					
Live	ers' property,	49.8' nor	th of E-W fer	nce & 48	3.0' wes						
WELL	OWNER: Radium	Patroleum	n Company			Liv	ers pro	perty	Test	Hole	TH-2
idre	px # : 1633 3°	th Marsh	n Avenue		-		Board of Ag			of Water	r Resource
ZIPr	ce : Kansas	City, Mis	ssouri 64126				Application	Number:	N/A		
WELL	S LOCATION WITH	DEPTH OF C	OMPLETED WELL.	27	. 5 A. EL	EVATION:	777.•.7	6 msl			
1 SEC	TION BOX:	ປຸກໄດ(s) ©round	water Encountered	1	24.	.ft. 2		ft.	3		
1			WATER LEVEL DO!								
- 1			o test data: . Well wa								
NW -			gpm: Well wa								
1			eter/.Oin. to								
			O BE USED AS:		vater supply		onditioning				عد .
1		i Domestic	3 Feedlot	8 Off field	water supply	y 9 Dewa	-		Other (S	pecify b	elow)
- SW -	SE	2 Indigation	4 industrial			ly 10 Obse	_		test h		
1	X V		acteriological sample						. mo/day	vr samp	le was sut
			er 31, 1987	•		Water Well				No)	
BLAN	K CASING USED:		5 Wrought iron	8 Cor	ncrete tile		SING JOIN		d	Clampe	
:1	3 RMP (SR)		6 Asbestos-Cement				,				
	4 ABS		7 Fiberglass								
3 dlamet	ter	. to	•								
	a land surface										
	OR PERFORATION A		, ,	. 71			10 Asbes	-			
-1	3 Stainless st	teel	5 Fiberglass		RMP (SR)		11 Other				
9	4 Galvanized		6 Concrete tile		ABS		12 None	• •			
R PERF	ORATION OPENINGS	ARE:	5 Gauz	ed wrapped		8 Saw			11 Non	e (ocea	hole)
tinuous s				wrapped			d holes		71 1401	C (OPCII	,
vered shi		punched	7 Torch				r (specify) .				
RFORA	TED INTERVALS:		ft. to		ft F						
			ft. to								
TAV	ACK INTERVALS:		ft. to								
		From	ft. to			rom		ft. to		· · · · •	fi.
MATERIA	AL: 1 Neat cem	ent 2	Cement grout	3 Ben		4 Other	clean d			005	
als: Fr	rom27.5. ft.			ft	10	ft .	From		# 10		#
nearest s	source of possible con	tamination:				estock pens			andoned		
tic tank	4 Laterai lir	nes	7 Pit privy			el storage			i well/Ga		· · · · ·
er lines	_ 5 Cess poo	ol	8 Sewage lago	on	(rtilizer storag	•		her (spec		ω\
ertight se	wer lines 6 Seepage		9 Feedyard			ecticide store			nor (spec		x*
m well?	east	•					100				
TO	I	ITHOLOGIC LO	OG	FROM	TO	1	LIT	HOLOGI	C LOG		
3	fill materia	als - rubb	le of glass.			of Blu	e River			vdro	arbor
	red bricks,					1	amples				53.76 V
	Marive soils			24.5	27.5	1	silt w				
5	clay, silty		rn. dry to				mottled				
			Pleistocene		 		to grav				
<u> </u>	deposits			1			e River				
7.5	clay, silty.	dark brn	. to brown	Left h	dle oper	for 2					
	slightly moi					ater in					
	Pleistocene			sample		l .	ampled				
24.0			wn - moist			th of 2					
	Loess windbl					ith dry					
	deposits										
24.5	sand, very v	ery fine	with eilter			olluted					
	gray mottled	•	· · · · · · · · · · · · · · · · · · ·	1 2011116	a arill	cutting	s cake	1 <u>CO</u> }	<u>adlum</u>	rrop	er cy
	to saturated			 	 						
.CT					<u> </u>	<u> </u>					
limaldani	OR LANDOWNER'S C	ETHICKHON:	: inis water well was	(1) constru	cted, (2) rec	constructed, o	(3) plugge	ad) under	my juris	diction a	ind was
Contractor's	'year) . December s Licensa No	J., . 1301 · ·	This Manage 186		and this rec	ord is true to	the best of	my know	iledge an	d belief.	Kansaş
siness nar	s License No	ronmantai	Samilage f	necord wa	s completed	on (mo/day)		moer	2.1.2.1	2.01	• • • • •
ONS: Use ty	pewriter or ball point pen. /	PLEASE PRESS FI	IHMLY and PRINT clearly	. Please fill in t	danks underlig	ne or circle the	COURT ANSWE	/s Sand	CO Ities Co	DISTO X2	insas
of Health an	nd Environment, Bureau of	Water Protection,	Topeka, Kansas 66620-7	320, Telephon	e: 913-862-93	60. Send one t	MATER WE	LL OWNS	ER and reti	Lone for	γουι

	TOTER WELL:	Fraction	2M T1 4 0T	1						
racks	on - Missouri	SW 14	SW 1/4	SE ¼	6	T	49N 4	<u> </u>	ے ک	1674
and direc	tion from nearest toy	vn or city street ac	ddress of well if loca	ted within al	y?		_	_		
ie Live	ers' property	101.8' nor	th of south	E-W fenc	e and 7	5.4' west	of east N-	-S fenc	e	
ER WELL	OWNER: Radiu	m Petroleum	Company, In	.c •		Livers	' property	Test	Hole	#TH-1
. Ad	Box # : 1633			•		Boa	rd of Agriculture.	Division o		
te, co			osuri 64126				lication Number:			
TE WELL	S LOCATION WITH	4 DEPTH OF CO	OMPLETED WELL.	26,	5 n. EL	EVATION:?	7475			
("IN SEC			vater Encountered							
			WATER LEVEL no							
~w -	NE		test data: Well wa							
1 1			gpm: Well wa							
			ter10in. t							
!		WELL WATER TO				8 Air condit	-			
sw -	SE	1 Domestic	3 Feedlot			9 Dewaterir				
		2 Irrigation	4 Industrial			bservati				
<u> </u>			acteriological sample							a was si
			er 31, 1987			Water Well Disi			No D	
	K CASING USED:		5 Wrought iron	•		CASIN				
Steel	- · · · · · · · · · · · · · · · · · · ·	•	6 Asbestos-Cement	•	er (specify b	•		ded		
PVC	4 ABS		7 Fiberglass		• • • • • • • • •		. Thre	aded		• • • • • •
asing diame	ter	n. to	ft., Dia	in.	to	ft., Dia .	,	in. to		†
	land surface		n., weight						• • • • •	
	OR PERFORATION		_ *		PVC		Asbestos-ceme			
Steel			5 Fiberglass		RMP (SR)		Other (specify)			
Brass	4 Galvanize		6 Concrete tile	9 4			None used (op			
	ORATION OPENING			ed wrapped		8 Saw cut		11 None	(open t	nole)
Continuous				wrapped		9 Drilled h	-			
Louvered sh		punched		r cut			pecify)			
N-PERFORA	TED INTERVALS:		ft. to .							
Ga EL P	ACK INTERNALO		ft. to .							
G, TEL P	ACK INTERVALS:	From	ft. to .							
OUT MATERIA	AL: 1 Neat cer		ft. to			rom				<u>ti</u>
	om26.5.ft.		Cement grout							
	Source of possible co			п.						
Septic tank	4 Lateral		7 Pit privy			estock pens		pandoned v		31i
	5 Cess po					el storage		l well/Gas		
	wer lines 6 Seepag			on		tilizer storage)
on from well?	East	e bir	9 Feedyard			ecticide storage	^	• • • • • • •		 !-ae*
A TO		LITHOLOGIC LO	G	FROM	TO TO	any feet? 15	LITHOLOGI	CLOG		
1.5			le of glass,	1	1	Alluvial	deposits		iver	
	red bricks.			1	 	T.D. 26.				
5 3.0			lack (soils)	left.	hole ope	en for one		em sam	pled	the
0 7.0	clay, silty					r in hole				
	slightly mo					., Inc. s				
	Pleistocene					from dep				
0 22.5	_		oist - loess		ctively		hole with			
	windblown P					mixed with				
5 23.0	clay, silty					. Pollut				
. 151	br. sand -				dium pro		Ca dilli c	<u> </u>		
	saturated -					<u> </u>				
	Alluvial de									
0 26.5	clay, silty			T						
	gray to bro									
			carbon odors							
NTE OR'S	OR LANDOWNER'S				12) rac	nostructed ~	nhugged Jada		ictica	
ted on (mo/day/	year)Decembe	r. 31. 1987	Hon Wes	Ciaconsilo	and this care	ord is to a to the	hast of my back	my junsul	haliat L	iu wa Canas
Well Contractor's	License No		This Water Wel	l Record was	s completed	no is tibe to the	December	31. 198	ਹਰਸ਼ਵਾ: ਨ 3.7	ча П\$а
he business nar	ne of Total Env:	ironmental	Services and	Technol	Octasono	11 / / / / / / / / / / / / / / / / / /	5	< - L	Pour	
RUCTIONS: Use by	pewriter or ball point pen.	PLEASE PRESS FIR	MLY and PRINT clearly	Please lill in h	lanks underlin	e or circle the corre	A Jasmara Sandi	op three cop.	Jo Kan	sas
www.c.neakn su	u Environment, Bureau o	ir Water Protection, T	opeka, Kansas 66620-7	320, Telephon	e: 91 3-8 62-936	i0. Send one to W	TER WELL OWNE	ER and retail	Tone for y	jour

\$	TER WELL:	Fraction SW1/4 of	Section Num	nber Township Number	Range Number
Tack SC	on - Missouri	SW 14 SW14	SEW 6	T 49N X	X R 32 XXW
and direct	tion from nearest town o	or city street address of well if local	ன் within city?		
s' pro	perty 30'east	of SE corner of Liver	e building & 3	5' west of east N	-S fence
R W	OWNER: Radium P	etroleum Company		Livers' property	Test Hole #TH-4
	Box # : 1633 Sou			Board of Agricus	ure, Division of Water Resource
		ity, Missouri 64126		. Application Numl	ber: NA
		DEPTH OF COMPLETED William	17.5 # FI	EVATION: 769.25 m	sl
IN SECT	"ON BOY	oth(s) Groundwater Encountered	13.5	ft. 2	ft. 3
1		ELL'S STATIC WATER LEVE	12.51 ft below land	:45 pm surface measured on mo/da	ay/yr January 2, 1988
ıi					s pumping gpr
WW	NE	. Yield gpm: We was			
.]		e Hole Diameter 10			
		LL WATER TO BE USED AT	3 Public water supply		11 Injection well
i			6 Cil field water supply		12 Other (Specify below)
- SW -	SE				test hole #4
1	!	a chemical/bacteriological carrates			•
		• •	•	Water Well Disinfected? Ye	
5 51 111	S mitte		· - · · · · · · · · · · · · · · · · · ·		Glued Clamped
	CASING USED:	5 Wrought inch			
el O	3 RMP (SR)		9 Other (specify be		Welded
2	4 ABS				Threaded
		o ft., ⊡a			
		in., weight			
	OR PERFORATION MA		7 PVC	10 Asbestos-o	
el	3 Stainless stee	-			cify)
53	4 Galvanized st		9 ABS	12 None used	• •
4.5	ORATION OPENINGS A		ed wrapped		11 None (open hole)
tinuous s			wrapped	9 Drilled holes	
vered shu	, ,				
EREASA		romtt. to			
		rom ft. to			
₹		rom			
		rom ft. to	ft., F		ft. to ft
MATERIA					ings
		0.0.0. ft., From			
	source of possible contain			- · · · · • · · · · · · · · · · · · · ·	4 Abandoned water well
ic tank	4 Lateral line	' '	•	•	5 Oil well/Gas well
er lines	5 Cess pool	8 Sewage lago		~	6 Other (specify below)
	wer lines 6 Seepage pi	it 9 Feedyard	13 inse	ecticide storage	• • • • • • • • • • • • • • • • • • • •
m well?	T			nany feet?	
то	1	HOLOGIC LOG	FROM TO		OGIC LOG
3		l - broken glass - re		open from 11:00 t	
	bricks & crus			vdrocarbons - wat	
88		- dk. brn. dry to		ter at 12.5' b.g.	1. at 11:10 &
		st - loess windblown	12:30 & 5:	45 pm	
	Pleistocene d		 		<u> </u>
13.5	1	- light to dk brown	F		(unhydrated) and
£		<u>s windblown Pleistoce</u>		ings. Wet frozen	drill cuttings
	deposits		taken to R	adium property	
17.5	clay, silty v	vith very very fine			
		brown to mottled gr.			
	wer to satura	red - Alluvtal	<u> </u>		
	deposits of F	Blue River	1		
	T.D. 17.5!				, 44.
TS C	OR LANDOWNER'S CE	RTIFICATION: This water well was	(1) constructed (2) rec	onstructed of (3) plugged in	nder my jurisdiction and wa-
(mo/day/	year) . January. 2.	. 19.88	and this race	ord is true to the past of my	knowledge and belief. Kansa:
		This Water Wel			
		nmental Service & Tec			By Alas.
NS: Use ly	pewriter or ball point pen. PL	EASE PRESS FIRMLY and PRINT clearly	. Please fill in blanks, underlin	ne or circle the correct Answers. S	end top three copies. Kansas
	•	ater Protection, Topeka, Kansas 66620-7			

4. 1 Harris	MISSOUT	ا د.	I 1/4 SW 1/4	SEv	6	T	49N	3 8	32 g w
-	tion from nearest to	own or city stre	et address of well if locate	ed within city	17				
pro	operty 78.0'	E of Wes	st N-S fence & 6	1.0' sou	ith of m	iddle eas	st bay d	loor	Mark.
			eum Company, Inc		······································	Liver's p	roperty	7 Test No.	le #TH-5
ddre	ox # : 1633	South Mar	sh			Во	ard of Agric	ulture, Division	of Water Resource
ZIF			Hissouri 64126			· Ap	plication Nu		
WELLS	S LOCATION WITH		F COMPLETED WELL	13.•5	ft. ELI	evation: . ?			
N SECT	TION BOX:	Depth(s) Gro	undwater Encountered	1 12.5	5: 48 ·	₱ ₁ 2		ft. 3	
	1	WELL'S STA	TIC WATER LEVEL	1,1 • 21 n	below land	surface measi	ured on ma	_{'day/yr} Janua	ary 2, 1988
NW -	NE		ump test data: Well water						
1		Est. Yield	gpm: Well water	erwas	· · · · · · · · · · · · · · · · · · ·	t. atter	ho	ours pumping .	ger
1		i	ameter10in. to						
1 1		1 Domes		5 Public wa				11 Injection	Specify below)
- SW -	SE	2 Irrigation							1e #5
		1 -	cal/bacteriological sample s						
	<u></u>	mitted		٠.	•	Water Well Dis		· · · · · · · · · · · · · · · · · · ·	_
BLANK	CASING USED:		5 Wrought Iron	8 Conc	rete tile	CASI	STAIOL DA	: Glued	. Clamped
ı	3 RMP (S	R) .	6 Asbestos-Cement						
	4 ABS		7 Fiberglass						
			ft., Dia					,	
			ln., weight						• • • • • • • • • • • • • • • • • • • •
	OR PERFORATION		E Eibarriana	7 8	-		O Asbestos		
i s	3 Stainless 4 Galvaniz		5 Fiberglass 6 Concrete tile	9 A	MP (SR) RS			ed (open hole)	
-	PATION OPENIN			ed wrapped		8 Saw cu			ne (open hole)
Inuous s		ill slot		vrapped		9 Drilled I			بادن المراب
ered shu	utter 4 Ke	y punched	7 Torch	cut		10 Other (:	specify) .		
RFORA	TED INTERVALS:		ft. to						
		From	ft. to		ft., F	rom		. ft. to	A COLUMN TO THE STATE OF THE ST
	014 14 177 - 01444 0								
AV	CK INTERVALS:		ft. to		ft., F	rom		. ft. to	
AV		From	ft. to	······	ft., F	rom		. ft. to ft. to	h ·
AATERIA	L: 1 Neat c	From ement	ft. to 2 Cement grout	. 3 Benti	ft., F	rom	irill ci	. ft. to ft. to uttings	<u></u>
ils: Fro	L: 1 Neat com135	From ement ft. to	ft. to	. 3 Benti	toft., F	rom 4 Other ft., From	irill Cu	tt. to tt. to uttings ft. to	
ปร: Fro าearest s	NL: 1 Neat com13.5	From ement ft. to	ft. to 2 Cement grout)QO. ft., From	. 3 Benti	to10 Live	rom	irill ci	ft. to tt. to tt. to tt. ings ft. to 14 Abandoneo	h
ปร: Fro าearest s	L: 1 Neat com135	From ement ft. to	ft. to 2 Cement grout	3 Bento	to10 Live	rom	irill cu	ft. to tt. to uttings ft. to 14 Abandoned 15 Oil well/Ga	
ils: Fromearest socialist tank	L: 1 Neat com 13 5	From ement ft. to	ft. to 2 Cement grout)Q0. ft., From	3 Bento	to	rom	irill cu	ft. to tt. to uttings ft. to 14 Abandoned 15 Oil well/Ga	ا الله الله الله الله الله الله الله ال
ils: From nearest so tank r lines rtight sev n well?	NL: 1 Neat com 135	From ement ft. to	ft. to 2 Cement grout 2QO. ft., From	. 3 Bento	to	rom 4 Other ft., From till,	irill ci	ft. to	d water well is well city below)
nearest s c tank r lines rtight sev n weil?	on13.5 source of possible of 4 Latera 5 Cess wer lines 6 Seepa southeast	From ement ft. to	ft. to 2 Cement grout 2QO. ft., From 7 Pit privy 8 Sewage lagor 9 Feedyard	3 Bento	to	rom 4 Other ft., From the stock pens to storage tilizer storage exticide storage any feet?	irill ci	ft. to tt. to tt. ings ft. to 14 Abandoned 15 Oil well/Ga 16 Other (specification)	d water well is well city below)
ils: From nearest so tank r lines rtight sev n well?	om13.5 source of possible of 4 Latera 5 Cess wer lines 6 Seepa southeast fill mate	From ement ft. to	ft. to 2 Cement grout 2QO. ft., From	3 Bento	to	rom 4 Other ft., Freestock pensel storage ecticide storage any feet? 15	irill ci	ft. to ft	d water well as well cify below)
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nearest s c tank r lines rtight sev n weil?	L: 1 Neat com13.5 Source of possible of 4 Latera 5 Cess Wer lines 6 Seepa southeast fill mate 1s. clay, sil	From ement tt. to	ft. to 2 Cement grout 2QO. ft., From 7 Pit privy 8 Sewage lagor 9 Feedyard CLOG d brick crushed dry, loess	FROM left in ho	to	rom 4 Other	irill ci	ft. to ft	d water well us well city below) water water no
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ris: From earest so c tank r lines rtight seven well? TO 2,0 7.0 9.5 1.5 2.5	source of possible of 4 Latera 5 Cess wer lines 6 Seepa southeast fill mate 1s. clay, sil windblown clay, sil saturated Pleistocer clay, sil dk.brn.to Alluvial of R LANDOWNER'S	From ement ft. to Contamination: il lines pool ge pit LITHOLOGIC rial - re ty, dk.br Pleistoc ty, dk.br Pleistoc ty, dk.br Pleistoc ty, dk.br coty, dk.br	ft. to 2 Cement grout 2.00. ft., From 7 Pit privy 8 Sewage lagor 9 Feedyard C LOG d brick crushed d try, loess ene deposits h. slightly own Pleistocene moist loess ene deposits wet to ndblown deposits ts ery fine sand, y gray mottled of Blue River ION: This water well was	3 Bento It. FROM Left In hot hento Wet f prope	ted) (2) received.	rom 4 Other ft., From the stock pensel storage s	irill cum	th. to tt. to uttings ft. to 14 Abandoned 15 Oil well/Ga 16 Other (special contents) under my juris under my juris	water well as well city below) water no ith tings. adium
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WATER WELL:		SW1/4 of	, ,	BCBOH HUIL	1001 1	م ۱۰۰۰۰۰۰			_	
Jackson - Missour	1 SW 14		SE 14	6	T	49N	XX	R	32	XEV
and direction from nearest to	own or city street add	tress of well if local	ted within city	?						
rs' property 34.5				of W N	-S fence	е				
R WELL OWNER: Radi	um Petroleum	Company, Inc	c.			Live	rs pa	PGFE	y Test	Hole
Adr Box # : 1633	South Marsh	•	.•		• ,	Board of A				
. Kans	as City, Miss	ouri 64126	•			Application				
E WELL'S LOCATION WITH IN SECTION BOX:	DEPTH OF CO	MPLETED WELL	23	.5. ft. ELE	EVATION:	774.8	7 901			
N	Depth(s) Groundwa	ater Encountered	1	:: و ۲۰۰۰	5 ⁶ 3 ² ρm···	• • • • • • • •				
	WELL'S STATIC V	VAIEH LEVEL	. + Y. • - T.	pelow land	surface me	asured on	me in	(s ting	45 y 4. s.	1200
NW NE		est data: Well wa								
	Est. Yield									
	Bore Hole Diamete							to		
	WELL WATER TO					_	ع مستور	rection	Liew	
SW SE	1 Domestic	3 Feedlot	6 Oil field w				e e e com	্রাণ্চer (S	pecify bel	OW
1 1 1	2 Imigation	4 industriai							le #6	
	Was a chemical/bad mitted	teriological sample	submitted to i		? Yes Water Weil				No No	was su
OF BLANK CASING USED:	5	Wrought Iron	8 Cond	rete tile	CA	SING JOI	NTS: 19 is:		Clamped	
eel 3 RMP (S	SR) 6	Asbestos-Cement	9 Other	(specify be	elow)			÷:1		د موسورة ما
/C 4 ABS	. 7	Fiberglass								~
ng diameter	.in. to	tt., Dia	in. t	o . <i></i> .	ft., C	Dia		n. to		h
ight above land surface		, weight		It	s./ft. Wall ti	hickness o	r gauge Na	.	. <i></i>	
SCREEN OR PERFORATIO		_	7 P				istos-cemie			
eel 3 Stainless	s steel 5	Fiberglass	8 RI	MP (SR)		11 Othe	r (specify)			
ass 4 Galvaniz		Concrete tile	9 A8				used (op			
OR PERFORATION OPENIN	IGS ARE:	5 Gauz	ed wrapped		8 Saw		, ,	-	e (open h	ole)
ntinuous slot 3 M	ill slot	6 Wire	wrapped		9 Drille	ed holes				•
uvered shutter 4 Ke	ey punched	7 Torch				r (specify)				
PERFORATED INTERVALS:		ft. to		ft F						
		ft. to								
PACK INTERVALS:		ft. to								
		ft. to								
	From	11. 10		ft Fi	rom					1.
MATERIAL: 1 Neat of			3 Bento		rom 4 Other			S		
	ement 2 C	ement grout	3 Bento	nite	4 Other	drill.	utting	s		
vals: From23,.5	tt. to	ement grout	3 Bento	to	4 Other	drill.o	utting	S . ft. to .		ft
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rals: From23.5 nearest source of possible of the tank	tement 2 C ft. to	ry to slight wn oist loess deposits of mottled fine br. to water well was	FROM left 5:53 hydro ly (unhydril)	note to 10 Liv 11 Fue 12 In 13 Inse How m TO hole or pm wate carbon drated cuttim	Allux T.D. en from and dr ags take	From Prom 200 Livial de 23.5 fm 3:10 Pluggerill cuen to R	THOLOGIC clean ed hold trings adium	s	water we swell sity below) River om. A clear henter frozenty	t no
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				1	Section Indus	1		1	
Jacks	on - Missouri	SW 14	SW 14	SE14	6	T	49N 🚁	я 32	
and direct	don from nearest town operty 96' N o	or city street ad f south E-	dress of well if locate. W fenceline	ed within city & 66 E	/? of West	N-S fence			المالية
ER WELL	OWNER: Radium	Petroleum	Company			Livers	' property	Test Hol	2 74-7
	Box # : 1633 So						of Agriculture, (
te,			ouri 64126		.*		cation Number:		
	LOCATION WITH 4			23.0	ft FII				
"IN SECT	ION BOX:	onth(a) Grounds	vater Encountered	18.0	by dril	line			
	<u> </u>	ELL'S STATIO	WATER LEVEL . 1	5.58 *	holow Sain	5 PM	ed on mo/day/yr	January	2
	"		test data: Well wat						
NW -	NE		gpm: Well water						
			er10in. to						
			BE USED AS:						
'			DE USED AS:	o Oll field	ater supply	9 Dewatering	oning it	Other (Caseity)	men.
SW -	SE	1 Domestic				y 10 Observation			
1	! ! ! ! ! ! ! ! ! ! ! !		a incustrial acteriological sample :						
		tted	·			Water Well Disini	ected? Yes	(No	<u> </u>
OF BLANK	(CASING USED:	,	5 Wrought Iron	8 Cone	ciete file	CASING	JOINTS: Glued		
teel	3 RMP (SR)	i i	6 Asbestos-Cement		r (specify be	elow)	Welde	d	
VC	4 ABS		7 Fiberglass					ded	
sing diamet	er in.	to	ft., Dia	in. 1	lo ,	ft., Dia	i	n. to	
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OR PERF	DRATION OPENINGS	ARE:	5 Gauze	ed wrapped		8 Saw cut		11 None (oper	n hoia)
ontinuous s	lot 3 Mill si	ot	6 Wire v	wrapped		9 Drilled hol		• •	
puvered shu	ntter 4∞Keyp	unched	7 Torch	cut		10 Other (spe	ecify)		
-PERFORA	TED INTERVALS:	From	ft. to		ft., F		• •		
			ft. to						
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٠٠. _ا حد ۱ ،		From				rom			
T MATERIA		From	ft. to		ft., F	rom	ft. to		ft
T MATERIA	L: 1 Neat ceme	From	ft. to	3 Bent	onite ft., F	rom 4 Other .dril	ft. to		<u>h</u>
T MATERIA		From 2 (ft. to	3 Bent	onite to	rom 4 Other .dril	ft. to 1 cuttings		h
T MATERIA	L: 1 Neat ceme	From ent 2 o 0	ft. to Cement grout . ft., From	3 Bent	onite to	rom 4 Other .dril ft., From	ft. to 1 cuttings	. ft. to andoned water	ftft
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T MATERIA irvals: Fro ne nearest s eptic tank awer lines	nL: 1 Neat cerne om	From ent 2 o 0	ft. to Cement grout . ft., From	3 Bent	to	from 4 Other .drilft., From cotock pens el storage tilizer storage	ft. to 1. cuttings 1	ft. toandoned water well/Gas well	ftft
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T MATERIA irvals: From enearest a eptic tank ewer lines atertight sever from well?	L: 1 Neat ceme om23,0ft. to cource of possible cont 4 Lateral lin 5 Cess poor wer lines 6 Seepage	From ent 2 o 0.00 amination: es pit	ft. to Cement grout 7. ft., From	3 Bent	to	4 Other .drilft., From entoek pens el storage tillzer Storage ecticide storage pany feet? 200	ft. to 1 cuttings 14 Aba 15 Oil 16 Oth	ift. to	ftft
T MATERIA irvals: Fro ne nearest a eptic tank ewer lines atertight ser from well? TO	L: 1 Neat ceme om23,0ft. to cource of possible cont 4 Lateral IIn 5 Cess pool wer lines 6 Seepage east Li	From ent 2 0 0.00 amination: es pit ITHOLOGIC LOCAL 2 glass,	ft. to Cement grout ft., From 7 Pit privy 8 Sewage lagor 9 Feedyard G concrete,	3 Bent	10 Line 11 Fue 12 Fer 13 Inse How m TO	4 Other .dril ft., From cotock pens el storage tilizer storage ecticide storage any feet? 200 open from	ft. to 1 cuttings 14 Aba 15 Oil 16 Oth Cuttings 14 Aba 15 Oil 16 Oth Cuttings	ift. to	h
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T MATERIA irvals: Fro ne nearest s eptic tank swer lines atertight set from well? TO 2	L: 1 Neat ceme om23,0ft. to cource of possible cont 4 Lateral lin 5 Cess pool wer lines 6 Seepage east Li fill material red bricks, clay, silty, loess windblo	From ent 2 o 0.00 amination: es pit THOLOGIC LOC l - glass, crushed ls dry, dk,b own Pleist	ft. to Cement grout ft., From ft., to ft.,	FROM 16 5: no	10 Line 11 Fue 12 Fel 13 Inse How m TO ft hole 55 pm w hydroc ntonite	open from arbon odor: (unhydrate	ft. to 1 cuttings 14 Aba 15 Oil 16 Oth CutthOLOGIC 4:15 to 5 LEWAS cle s. Plugge ed) and dr	tt. to	h well ow) At ear th ngs
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				HEET 1 OF 1	
OJECT NAME	INDUSTRIAL SERVICE	CORPORATION		ROJECT NO ATEApril_6, 1988	
TUMBER	PROJECT LOCATION 1	633 South Marsh, Kansas City,			
SBH-1		oks DRILLED BY Dwight W. Brink			
1	N 786.2 EI	LEVATION DATUM		e**	
				T appared Names III	2
PTH SAMP		DESCRIPTION	u.s.c.	SPECIAL NOTES AN	
TYPE	t I	Fill material-Limestone		Cored 0'3" to 1'2'	
-		aggregate Clay dark gray to black;			-
_		silty; w/oil soaked plant root	S	Composited sample split w/MDNR	-
	0'10" - 1'2"	Limestone, shale, clay rubble zone woil staining			4
		on limestone pebbles		Refusal @ 1'2" Total Depth 1'2"	<i>-</i>
•	1'2" Limeston	ne ·	,	· .	
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BOLCESC LOC

TECT	NAME IN	NDUSTR:	IAL SERVICE CORPORATION	SHEET 1 OF 1 PROJECT NO.
4				DATE April 6, 1988
G.	ANDER 1		CT LOCATION 1633 South Marsh, Kansas City, Mo. D BY K.J. Brooks DRILLED BY Dwight W. Brinkley	
вн-2				
FACE	ELEVATIO	N/8	4.7 ELEVATION DATUM	
ТН	SAMP	LE	DESCRIPTION U.S.	C SPECIAL NOTES AND
	TYPE	REC	DESCRIPTION C.S.	FIELD OBSERVATIONS
			O'-0'8" Fill material-limestone aggregate and clay fill with oil residue — O'8"-1'0" Clay-lt.yellowish-brn; silty moist; moderate hydrocarbon odor— 1'0"-5'8" Clay-greenish gray; silty at — top, becoming less silty at depths; slightly moist; contains a few limestone— pebbles; oil stained root cavities; moderate— hydrocarbon—odor.——————————————————————————————————	cored 0'8" to 5'8".— Full Recovery.Collect. composite samples — from 8"-38" and 38"-68" —
			5'3"-6'2" Clay- same as 1'0" to 5'8", — with angular limestone pebbles. — 6'2" Limestone	cored 5'8" to 6'2" — Full Recovery. Collect. samples (split w/MDNR) for same. Refusal @ 6'2" Total depth 6'2"
_				
		•		

BORING LOG

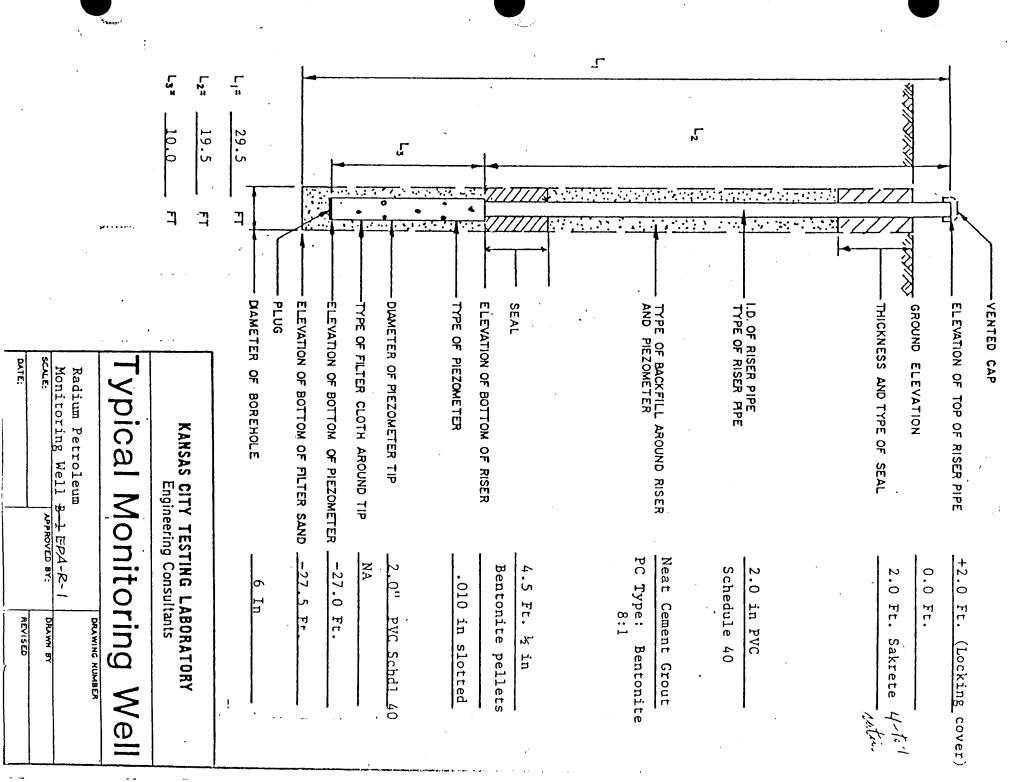
					HEET 1 OF 2
RO -	NAME	Indus	trial Service Corporation	P	ROJECT NO.
			1622 South Month Woman City	D	ATE April 5, 1988
ORING	NUMBER	PROJE	CT LOCATION 1633 South Marsh, Kansas City,	Mo. R	IG Mobile B-80
C DII	,	LOGGE	D BY K.J. Brooks DRILLED BY Dwight W. Brin	kley w	ATER ENTERS
SBH-	3	70	25 (0)		
URFACE	ELEVATIO),N	35 (Apper)ELEVATION DATUM		
EPTH	SAME	H.F.			SPECIAL NOTES AND
		T	DESCRIPTION	U.S.C.	1
0	TYPE	REC	0-1 Fill material Limestone aggregate with		FIELD OBSERVATIONS
			free oil and water		
_					11011
			1'-3' Fill material - clay fill w/gravel		cored from 1'3" to 6'0"
					6.0
			3'-8'6" Clay brown to dark brown; silty -		
			moist; oil stained root cavities;		
			slight hydrocarbon odor —		-
	,				
5					
:			·		cored from 6'0" to
					1110
			<u> </u>		
			- · ·		_
]	-		
10		j			
10			8'5" - 26' Clay-greenish gray, silty to		
			sandy;moist;w/oil_stained root		cored 11'0" to 16'0"
			cavities; slight hydrocarbon		no recovery
			odor		
					,
			_		,
15					cored 16'0" to 21'0"
					recovered 1'0" (16-17
			-		in barrels
			- -		
			_		,
			<u> </u>		1
.				. T	
20				• 1	24
				,	cored 21'0" to 26'0
					No recovery
		•	<u> </u>		
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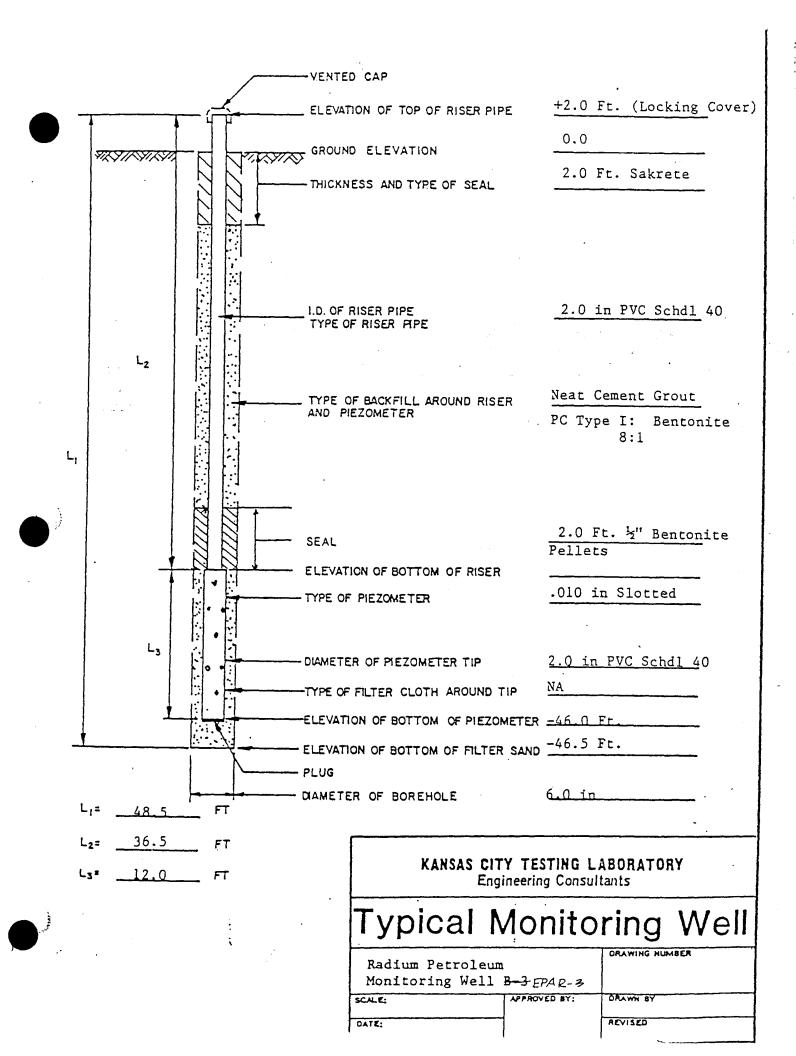
MORING LOG

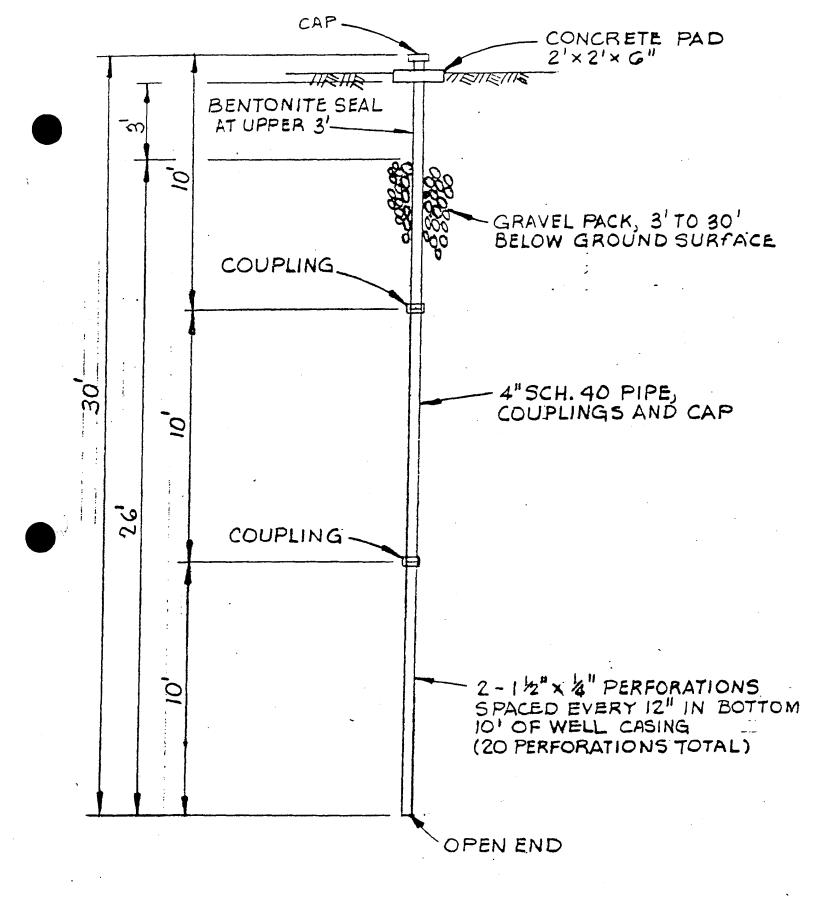
PR	r name	PF	OJECT NO. ATE April 5, 1988		
BORING	NUMBER	PROJE	CT LOCATION 1633 South Marsh, Kansas City, M D BY K.J. Brooks DRILLED BY Dwight W. Brinkley	10. RI	G Mobile B-80
SBH-	-3	LOCKIE	If BI K.d. Brooks DKILLED BI DWIGHT W. Brinkley	<u>/</u>	TIER EVIERS
SURFACE	E ELEVATIO)N	ELEVATION DATUM		
EPTH	SAME	PLE			SPECIAL NOTES AND
3	TYPE	REC	DESCRIPTION U.S	s.c.	FIELD OBSERVATIONS
26			8'6" - 26'0" Clay-greenish gray; filty		
20			to sandy; moist; w/oil stained root cavities		Boring Total Depth 26'0"
. <u></u> -	-		_ loot cavities		Depth 20 0
					right of the second
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APPENDIX A-2

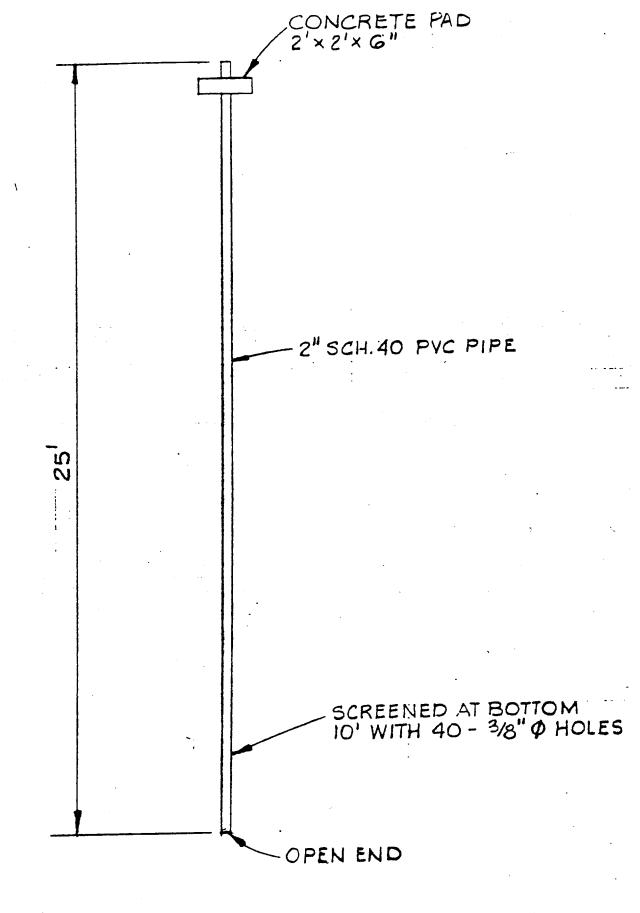
MONITORING WELL CONSTRUCTION DIAGRAMS







TYPICAL MONITORING WELL CONSTRUCTION MONITORING WELLS MW-I THRU MW-6



TYPICAL MONITORING WELL CONSTRUCTION MONITORING WELLS PVC-1 THRU PVC-3

APPENDIX A-3

MONITORING WELL PLUGGING REPORT

INDUSTRIAL

SERVICE

C ORPORATION

P.O. Box 3249

Shawnee, KS 66203

(913) 631-3300

Telefax No. (913) 631-1339

April 20, 1992

Mr. Randy Brown Missouri Department of Natural Resources Kansas City Regional Office 3800 S. Elizabeth, Suite G Independence, MO 64157

Re: Industrial Service Corporation, Kansas City, Missouri

Monitoring Well Plugging and Removal

Dear Mr. Brown:

Enclosed please three (3) copies of the Removal and Plugging Report for the monitoring wells at our Kansas City location.

Would you please witness the Plugging Affidavits (9 in each report) in all three copies, keeping one for yourself, send one to Tom Ratermann and return one to us (self-addressed envelope enclosed).

If you have any questions, please call me at 631-3300.

Sincerely,

Kénneth J. Brooks

Project Manager/Geology

KJB:jd Enclosure

cc: Ronald D. Deffenbaugh

John Murphy Tim Roche

REPORT ON REMOVAL AND PLUGGING

OF MONITORING WELLS

Industrial Service Corporation 1633 South Marsh Kansas City, Missouri

April 6, 1992

REPORT ON REMOVAL AND PLUGGING OF MONITORING WELLS INDUSTRIAL SERVICE CORPORATION KANSAS CITY, MISSOURI

1.0 INTRODUCTION

Environmental technicians from Total Environmental Services and Technologies (TEST), a division of Deffenbaugh Industries, Shawnee, Kansas performed removal and plugging of nine ground water monitoring wells at the Industrial Service Corporation facility at 1633 S. Marsh, Kansas City, Missouri between the dates of January 6-24, 1992. TEST representatives were Charles West and B.C. Millet. The field activities were witnessed by Randolph L Brown, Missouri Deparment of Natural Resources (MDNR), Independence, Missouri.

The well abandonment plan was prepared by Kenneth J. Brooks, Project Manager, Deffenbaugh Industries. Procedures for this activity are described in the well abandonment plan, which consists of the following documents:

- an April 4, 1990 ISC letter to MDNR;
- a September 27, 1990 ISC letter to EPA;
- a February 7, 1991 ISC letter to MDNR; a May 2, 1991 ISC letter to MDNR; 3.
- an October 29, 1991 MDNR letter to ISC.

Approval for the plan was given to ISC by MDNR on October 29, The primary reference used was <u>Handbook of Suggested Practices</u> for the Design and Installation of Monitoring Wells, (USEPA No. 600/4-89/034, March, 1991).

Field activities included abandonment and plugging of monitoring well nos. MW-1, 2, 3, 4, 5, and 6, and PVC-1, 2, and 3. Prior to abandonment of the wells, two water samples and one oil sample were collected from the wells. Samples were delivered to Quality Analytical Services, Kansas City, Missouri, where they were analyzed for volatile organics, metals, pesticides, PCBs, and other parameters.

TABLE 3-1

MONITORING WELL CONSTRUCTION SUMMARY

Industrial Service Corporation Kansas City, Missouri

Monitoring Well No.	Date <u>Drilled</u>	Ground <u>Elevation (ft)</u>	Top of Casing (ft)	Depth (ft. below G.L.)	Top of <u>Elev.(ft/MSL)</u>	Screens <u>Depth (ft)</u>	Screen <u>Length (ft)</u>	Construction <u>Details</u>
EPA-R-1	8-19-86	782 ± (est)		29.5	762.5	19.5	10	2" PVC
EPA-R-2	8-19-86	782 ± (est)		40.0	Well Plugged ar	nd Abandoned		2" PVC
EPA-R-3	8-19-86	786 ± (est)		48.5	749.5	36.5	12	2" PVC
MW-1	10-11-86	782.24	781.59	30.23	742.01	20.23	10	4" pipe
MW-2	10-12-86	783.61	783.43	25.20	768.41	15.20	10	4" steel pipe
MW-3	10-11-86	784.38	783.93	29.51	763.87	19.51	10	4" steel pipe
MW-4	10-11-86	779.42	780.09	28.44	760.98	18.44	10	4" steel pipe
MW-5	10-11-86	782.69	782.92	26.35	766.34	26.35	10	4" steel pipe
MW-6	10-12-86	784.93	784.72	28.23	766.70	18.23	10	4" steel pipe
PVC-1	9-20-86	778.79	778.82	23.82	764.97	13.82	10	2" PVC
PVC-2	9-20-86	774.69	775.29	19.48	765.21	9.48	10	2" PVC
PVC-3	9-20-86	782.81	782.56	20.67	772.14	10.67	10	2" PVC

⁻⁻ Data Not Available

Removal of protective surface casings from monitoring wells at the site began on January 6, 1992. Table 1 contains a summary of monitoring well construction at the site. Upon removal of the protective casings it was confirmed that none of the wells had been originally grouted in place. Past drilling experience at the site had shown that hole collapse was not expected to be a problem. Because of this, it was recommended to the MDNR field representative that, as per USEPA guidelines for removal of wells not originally grouted, that the first attempt to remove the well casings would be by using the drill rig to "bump" the casing and pull it out of the hole. accomplished by using a welding torch to cut holes in the top of the steel casings. A clevis pin was then inserted through the holes, which was in turn attached to a 1/2 inch cable sling on the pulling unit on the drill rig. The pulling unit was then used to raise the casing out of the ground.

After receiving approval of the MDNR field representative, the casings for well nos. MW-4, MW-5, PVC-1, and MW-1 were pulled using the method described above. No mechanical problems or hole collapse problems were encountered using this method.

Although the method described is adequate, it was decided to modify the casing removal method to insure a better bond between the plugging grout and boring walls. In removing casings from wells MW-2, MW-3, MW-6, and PVC-3, hollow stem augers were used to overdrill the casings before they were pulled. This insured the removal of any gravel pack from around the well, however, in no case was any evidence found that any gravel pack had been installed.

When attempts were made to pull casing for well PVC-2, only the upper two feet of casing came out of the ground initially. The casing in the ground appeared to be in a deteriorated condition and probably not in a suitable condition to overdrill with hollow stem augers. The casing was removed by use of a 4 inch diameter air rotary bit to drill out the casing.

Once the well casings had been removed from the ground, the holes were plugged using a bentonite slurry mix consisting of the following mix ratio:

94 lb. bag Portland Type A cement 5% Sodium Bentonite Powder 5-6 gallons of water

The slurry mixture was injected into the hole using a tremie pipe, starting at the bottom of the hole and backing the pipe out as the hole was filled. In order to make the mixture thin enough to flow through the tremmie pipe, it was necessary to add water to the mixture. The slurry was injected until it was within 4 feet of the ground surface. The grout was allowed to set overnight and was checked the following day for settling. If settling had occurred, more grout was placed in the hole. The hole was then topped off with a two foot thick plug of neat cement, into which was placed a four foot long piece of 1/2 inch diameter steel rebar. This will allow the hole to be located

in the future, if necessary. The final two feet of each boring was filled with native soil or gravel, which ever was appropriate for the location. Table 2 contains a summary of calculated and actual grout volumes used for plugging the holes. Plugging affadavits for each monitoring well are found in Attachment 1. A map showing locations of the plugged wells is found on Attachment 2.

The working end of the drilling rig, augers, and other equipment were decontaminated between plugging of each boring. The rig was moved to an area set up inside the tank farm containment area, so that all decontamination fluids were collected into the containment pit at the northwest corner of the tank farm. Decontamination was by using a detergent wash and high pressure steam/water rinse.

TAB

MONITORING WELL PLUGGING SUMMARY

INDUSTRIAL SERVICE CORPORATION KANSAS CITY, MISSOURI

Well No.	Date <u>Plugged</u>	Depth <u>(ft)</u>	Plugging Hole Diameter (inches)	Calculated Volume*(gallons)	Actual Volume* of grout used (gal)	<u>Remarks</u>
MW-1	1-8-92	30.2	4½ in (approx)	23 gal.	23 gal.	pulled casing
MW-2	1-14-92	25.2	8 in	60 gal.	65 gal.	overdrilled, plugged
MW-3	1-15-92	29.5	11 in	132 gal.	118 gal.	overdrilled, plugged
MW-4	1-7-92	28.44	4½ in (approx)	22 gal.	25 gal.	pulled casing
MW-5	1-7-92	26.35	4½ in (approx)	21.7 gal.	24 gal.	pulled casing
MW-6	1-24-92	28.2	8 in	68 gal.	70 gal.	overdrilled
PVC-1	1-8-92	23.8	3 in (est)	9 gal.	10 gal.	pulled casing
PVC-2	1-8-92	19.48	4½ in	15 gal.	18 gal.	air rotary drilled out casing
PVC-3	1-8-92	20.67	8 in	49 gal.	55 gal.	overdrilled

Fill depth was 2 feet below ground surface.

3.0 MONITORING WELL SAMPLING

Prior to abandonment of the wells, a check was made to see if any of the wells had fluids in the casing. If fluids were present an attempt was made to obtain samples for analytical purposes. Water samples were collected from wells MW-4 and MW-5, and one oil sample was collected from well MW-2. The wells were not bailed prior to obtaining the samples, however, the results still give an indication of contamination present in the wells. Complete results for the three samples are found in Attachment 3. A summary of detected analytes for the two groundwater samples is as follows:

Compound	<u>MW-4</u>	<u>MW-5</u>	
Benzene Ethylbenzene Toluene	817 ug/L 297 ug/L 2,200 ug/L	402 ug/L 396 ug/L 2,070 ug/L	
Acenapthene Anthracene Bis(2-ethylhexyl) phthalate Bis(2-chloroisopropyl) ether Fluorene Hexachloroethane Napthalene 2,4-Dimethylphenol Phenol		23.4 ug/L 11.3 ug/L 27.3 ug/L ND 36.5 ug/L 46.9 ug/L 253 ug/L 38.6 ug/L ND	
PCB-1260	2.48 ug/L	ND	
Arsenic (total) Barium (total) Beryllium (total) Cadmium (total) Chromium (total) Copper (total) Lead (total) Nickel (total) Zinc (total)	0.832 mg/kg 3.59 mg/kg 0.004 mg/kg ND 0.111 mg/kg 0.482 mg/kg 0.732 mg/kg 0.340 mg/kg 2.02 mg/kg	5.39 mg/kg 12.1 mg/kg 0.18 mg/kg 0.014 mg/kg 0.398 mg/kg 2.17 mg/kg 9.62 mg/kg 1.40 mg/kg 8.42 mg/kg	

Monitoring Well

Plugging Affidavits

Industrial Service Corporation 1633 South Marsh Kansas City, Missouri

PART I: Date January 8, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number PVC-1 , used as monitoring well.
PART II: (fill in as completely as possible)
The well was 23.8 feet deep, at 778.79 elevation, was drilled in 1986, by
Industrial Service Corporation , file number .
Was pump removed from well? Yes No N.A X
Describe method used to plug well: Pulled 2 in. PVC casing with drill rig. Backfilled
hole with 10 gallons bentonite grout slurry to 4 foot below ground surface (BGL).
Filled hole with neat cement from 4 to 2 ft BGL and installed 4 foot long, 1/2 diameter
Comments (reason for plugging, known contaminants, etc.)
Well removed because of inadequate construction materials and design.
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by Division

PART I: Date January 8, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number PVC-2 , used as monitoring well.
PART II: (fill in as completely as possible)
The well was 19.5 feet deep, at 774.69 elevation, was drilled in 19_86, by
Industrial Service Corporation , file number .
Was pump removed from well? Yes No N.A X Describe method used to plug well: Drilled out 2 in PVC casing 2/4" air rotary. Backfilled
from 19.5 ft to 4 ft BGL w/18 gal. bentonite grout. Backfilled from 4 ft to 2 ft BGL
w/neat cement. Installed 4 ft long, 1/2 diameter steel rebar. Backfilled from 2 ft BGL to
surface w/gravel and soil mixture.
Comments (reason for plugging, known contaminants, etc.)
Driller <u>Total Environmental Services and Technologies, Shawnee, Kansas</u>
Witnessed by

PART I: Date January 10, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number PVC-3 , used as monitoring well .
PART II: (fill in as completely as possible)
The well was 20.7 feet deep, at 782.8 elevation, was drilled in 1986, by
Industrial Service Corporation , file number
Was pump removed from well? Yes No N.AX_
Describe method used to plug well: Overdrilled 2 in PVC casing w/7 7/8" augers and pulled.
Backfilled from 20.7 to 4 ft BFL w/55 gal. bentonite slurry mixture. Backfilled from 4 to 2 ft
BGL w/neat cement. Installed 4 ft long, 1/2 in. diameter steel rebar. Backfilled from 2 ft
BGL to surface w/gravel and soil mixture.
Communication (many for almost languages and)
Comments (reason for plugging, known contaminants, etc.)
Well removed because of inadequate construction materials and design.
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by

PART I: Date January 8, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number <u>MW-1</u> , used as <u>monitoring well</u> .
PART II: (fill in as completely as possible)
The well was 29.6 feet deep, at 782.24 elevation, was drilled in 1986, by
Industrial Service Corporation , file number .
Was pump removed from well? Yes No N.A X
Describe method used to plug well: Pulled 4 in dia. steel casing w/drill rig. Backfilled 30 to
4 ft BGL w/23 gal. bentonite grout sluffy. Backfilled 4 to 2 ft BGL w/neat cement. Installed
4 ft long, 1/2 in. diameter steel rebar. Backfilled from 2 ft BGL to surface w/ gravel and soi
mixture.
Comments (reason for plugging, known contaminants, etc.)
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by Division

PART I: Date January 14, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number <u>MW-2</u> , used as <u>monitoring well</u> .
PART II: (fill in as completely as possible)
The well was <u>25</u> feet deep, at <u>783.61</u> elevation, was drilled in 19 <u>86</u> , by
Industrial Service Corporation , file number
Was pump removed from well? Yes No N.A X Describe method used to plug well: Overdrilled 2 in PVC casing w/7 7/8" augers. Pulled
4" steel casing with drill rig. Backfilled from 25 to 4 ft BGL w/65 gal. bentonite slurry.
Backfilled from 4 to 2 ft BGL w/neat cement. Installed 4 ft long, 1/2 in. diameter steel
rebar. Backfilled from 2 ft BGL to surface w/gravel and soil mixture.
Comments (reason for plugging, known contaminants, etc.)
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by Division

PART I: Date January 10, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number MW-3, used as monitoring well.
PART II: (fill in as completely as possible)
The well was 29.5 feet deep, at 784.38 elevation, was drilled in 19.86, by
Industrial Service Corporation , file number
Was pump removed from well? Yes No N.AX_
Describe method used to plug well: Overdrilled steel casing w/11 in. augers. Pulled 4" steel
casing w/augers. Backfilled from 29.5 to 4 ft BGL w/18 gal. bentonite slurry. Backfilled
from 4 to 2 ft BGL w/neat cement. Installed 4 ft long, 1/2 in. diamater steel rebar.
Backfilled from 2 ft BGL to surface w/gravel and soil mixture.
Comments (reason for plugging, known contaminants, etc.)
Well removed because of inadequate construction materials and design.
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by Division

PART I: Date January 7, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number MW-4, used as monitoring well.
PART II: (fill in as completely as possible)
The well was 28.4 feet deep, at 779.42 elevation, was drilled in 19.86, by
Industrial Service Corporation , file number
Was pump removed from well? Yes No N.A X
Describe method used to plug well: Pulled 4" diameter steel casing w/drill rig. Backfilled from
28.4 to 4 ft BGL w/25 gal. bentonite grout slurry. Backfilled from 4 to 2 ft BGL w/neat cement.
Installed 4 ft long, 1/2 in. diameter steel rebar. Backfilled from 2 ft BGL to surface
w/gravel and soil mixture.
Comments (reason for plugging, known contaminants, etc.) Well removed because of inadequate construction materials and design.
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by Division

PART I: Date January 7, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South Marsh, Kansas City, Missouri.
Well Number MW-5, used as monitoring well.
PART II: (fill in as completely as possible)
The well was <u>26.3</u> feet deep, at <u>782.69</u> elevation, was drilled in 19 <u>86</u> , by
Industrial Service Corporation , file number
Was pump removed from well? Yes No N.A X
Describe method used to plug well: Pulled 4" dia. steel casing w/drill rig. Backfilled from
26.3 ft to 4 ft BGL w/24 gal. bentonite grout. Backfilled 4 ft to 2 ft BGL w/neat cement.
Installed 4 ft long, 1/2 in. diameter steel rebar. Backfilled from 2 ft to surface w/gravel and soil
mixture.
Comments (reason for plugging, known contaminants, etc.) Well removed because of inadequate construction materials and design.
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by Division

PART I: Date January 24, 1992
The well is located in <u>Jackson</u> County, described as <u>SW</u> 1/4, <u>SE</u> 1/4, Section <u>6</u> , Township <u>49N</u> , Range <u>32</u> W. Formerly served Industrial Service Corporation, 1633 South
Marsh, Kansas City, Missouri.
Well Number <u>MW-6</u> , used as <u>monitoring well</u> .
PART II: (fill in as completely as possible)
The well was 28.2 feet deep, at 784.93 elevation, was drilled in 19_86, by
Industrial Service Corporation , file number
Was pump removed from well? Yes No N.A X
Describe method used to plug well: Overdrilled steel casing w/7 7/8" augers. Pulled
4" steel casing w/drill rig. Backfilled from 28.2 to 4 ft BGL w/70 gal. bentonite grout
Backfilled from 4 to 2 ft BGL w/neat cement. Installed 4 ft long, 1/2 in. diameter steel rebar
Backfilled from 2 ft BGL to surface w/native soil.
Comments (reason for plugging, known contaminants, etc.)
Well removed because of inadequate construction materials and design.
Driller Total Environmental Services and Technologies, Shawnee, Kansas
Witnessed by Division

Site Plan - Plugged Well Locations

Monitoring Well Results of Analyses (Pre-Plugging Samples) January 7, 1992

Industrial Service Corporation 1633 South Marsh Kansas City, Missouri

Monitoring Well

Results of Analyses (Pre-Plugging Samples) January 1, 1992

Industrial Service Corporation 1633 South Marsh Kansas City, Missouri

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-1

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001 DATE RECEIVED: 1-7-92

DATE SAMPLED: 1-7-92 SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

PARAMETER	METHOD	DET. LIMIT	CONC.
	:	: (mg/L)	: (mg/L)
: Total Metals	:	:	:
: Antimony	: EPA 200.7	: 0.06	: ND
: Arsenic	: EPA 206.2	: 0.0047	: 0.832
: Barium	: EPA 200.7	: 0.032	: 3.59
: Beryllium	: EPA 200.7	: 0.001	: 0.004
Cadmium	: EPA 200.7	: 0.005	: ND
Chromium	: EPA 200.7	: 0.008	: 0.111
Copper	: EPA 200.7	: 0.009	: 0.482
: Lead	: EPA 239.2	: 0.0032	: 0.732
: Mercury	: EPA 245.1	: 0.0002	: ND
: Nickel	: EPA 200.7	: 0.015	: 0.340
: Selenium	: EPA 270.2	: 0.0022	: ND
: Silver	: EPA 200.7	: 0.008	: ND
: Thallium	: EPA 279.2	: 0.0037	: ND
: Zinc	: EPA 200.7	: 0.008	: 2.02
:	:	:	:
:	:	:	:
:	;	;	:

D = NOT DETECTED NA = NOT APPLICABLE

Keirn Fllmore



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-2

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

DATE RECEIVED: 1-7-92 QAS #: 20107001

DATE SAMPLED: 1-7-92 SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

PARAMETER	METHOD	DET. LIMIT	CONC.
:	:	: (mg/L)	: (mg/L)
:	:	:	:
: Ammonia	: EPA 350.1	: 0.1	: 10.8
: Biochemical	: EPA 405.1	: 1.0	: 396
: Oxygen Demand	•	:	:
: Chemical Oxygen	: EPA 410.4	: 5.0	: 1,210
: Demand	:	:	:
Cyanide, Total	: EPA 335.2	: 0.01	: ND
Oil & Grease	: EPA 413.1	: 0.2	: 193
: pH	: EPA 150.1	: NA	: 6.83
: Phenolics	: EPA 420.1	: 0.05	: 2.70
: Sulfide, Total	: EPA 376.2	: 0.1	: ND
: Total Organic	: EPA 415.1	: 0.05	: 252
: Carbon	:	:	:
: Total Petroleum	: EPA 418.1	: 10	: 135
: Hydrocarbons	:	:	:
: Total Suspended	: EPA 160.2	: 4.0	: 2,120
: Solids	:	:	:
:	:	:	:

= NOT DETECTED NA = NOT APPLICABLE

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-3

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001

DATE RECEIVED: 1-7-92

DATE SAMPLED: 1-7-92

SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

VOLATILE O	RGANIC COMPOUNDS - EPA	A 624
PARAMETER	DET. LIMIT (ug/I	CONC. (ug/L)
Benzene	: 250	: 817
Bromodichloromethane	: 250	: ND
Bromoform	: 250	: ND
Bromomethane	: 500	: ND
Carbon tetrachloride	: 250	: ND
Chlorobenzene	: 250 : 500	: ND
Chloroethane	: 500	: ND
2-Chloroethylvinyl ether	: 500	: ND
2-Chloroethylvinyl ether Chloroform Chloromethane	: 250	: ND
Chloromethane	: 500	: ND
Dibromochloromethane	: 250	: ND
1,2-Dichlorobenzene	: 250	: ND
1,3-Dichlorobenzene	: 250	: ND
1,4-Dichlorobenzene	: 250 : 250 : 250 : 250	: ND
1,1-Dichloroethane	: 250	: ND
1,2-Dichloroethane	: 250	: ND
1,1-Dichloroethene trans-1,2-Dichloroethene	: 250	: ND
trans-1,2-Dichloroethene	: 250	: ND
1,2-Dichloropropane	: 250	: ND
cis-1,3-Dichloropropene	: 250	: ND
trans-1,3-Dichloropropene		: ND
Ethyl benzene	: 250	: 297
Methylene chloride	: 250	: ND
1,1,2,2-Tetrachloroethane Tetrachloroethene	: 250	: ND
Tetrachloroethene	: 250	: ND
TOTACHE	. 200	: 2,200
1,1,1-Trichloroethane	: 250	: ND
1,1,1-Trichloroethane 1,1,2-Trichloroethane	: 250	: ND
Trichloroethene	: 250	: ND
richiorofiuoromethane	: 500	: ND
Vinyl chloride	: 500	: ND

ND = NOT DETECTED

* TENATIVELY IDENTIFIED COMPOUND

Kevin L. Fillmore



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-4

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001 DATE RECEIVED: 1-7-92

DATE SAMPLED: 1-7-92 SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

SEMI-VOLATILE ORG	GANIC COMPOUNDS - EPA	625	
PARAMETER	DET. LIMIT (ug/L)		CONC. (ug/L)
Acenaphthene	10	:	ND
Acenaphthylene	10	:	ND
Anthracene	10	:	ND
Benzo(a)anthracene	10	:	ND
Benzo(b)fluoranthene	10	:	ND
Benzo(k)fluoranthene	10	:	ND
Benzo(a)pyrene	10	:	ND
Benzo(ghi)perylene	10	:	ND
Benzyl butyl phthalate	10	:	ND
Bis(2-chloroethyl) ether	10	:	ND
Bis(2-chloroethoxy) methane	10	:	ND
Bis(2-ethylhexyl) phthalate	10	;	31.7
Bis(2-chloroisopropyl) ether	10	:	10.1
4-Bromophenyl phenyl ether	10	:	ND
2-Chloronaphthalene	10	:	ND
4-Chlorophenyl phenyl ether	10	:	ND
Chrysene	10	:	ND
Dibenzo(a,h)anthracene	10	:	ND
Di-n-butylphthalate	10	:	ND
1,3-Dichlorobenzene	10	:	ND
1,2-Dichlorobenzene	10	:	ND
1,4-Dichlorobenzene	10	:	ND
3,3'-Dichlorobenzidine	20	:	ND
Diethyl phthalate	10	:	ND
Dimethyl phthalate	10	:	
2,4-Dinitrotoluene	10	:	ND

ND = NOT DETECTED
* TENATIVELY IDENTIFIED COMPOUND

Kevin L. Fillmore

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation REPORT #: 20107001-4

: Kansas City, MO

ATTN: Ken Brooks

DATE: 1-23-92

- PAGE 2 -

SEMI-VOLATILE ORGANIC COMPOUNDS - EPA 625

PARAMETER	DET. LIMIT (ug/L)	CONC. (ug/L)
2,6-Dinitrotoluene	10	: ND
Di-n-octylphthalate	10	: ND
Fluoranthene	10	: ND
Fluorene	10	: ND
Hexachlorobenzene	10	: ND
Hexachlorobutadiene	10	: ND
Hexachloroethane	10	: 15.9
Indeno(1,2,3-cd)pyrene	10	: ND
Isophorone	10	: ND
Naphthalene	10	: 41.1
Nitrobenzene	10	: ND
N-Nitrosodi-n-propylamine	10	: ND
Phenanthrene	10	: ND
Pyrene	10	: ND
1,2,4-Trichlorobenzene	10	: ND
4-Chloro-3-methylphenol	20	: ND
2-Chlorophenol	10	: ND
2,4-Dichlorophenol	10	: ND
2,4-Dimethylphenol	10	: 55.0
2,4-Dinitrophenol	50	: ND
2-Methyl-4,6-dinitrophenol	50	: ND
2-Nitrophenol	10	: ND
4-Nitrophenol	50	: ND
Pentachlorophenol	50	: ND
Phenol	10	: 84.0
2,4,6-Trichlorophenol	10	: ND

ND = NOT DETECTED * TENATIVELY IDENTIFIED COMPOUND

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-5

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001

DATE SAMPLED: 1-7-92

DATE RECEIVED: 1-7-92

SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

PESTICIDES AND PCBS - EPA 608				
PARAMETER	DET. LIMIT (ug/L)		CONC. (ug/L)	
Aldrin	0.04	:	ND	
alpha-BHC	0.03	:	ND	
beta-BHC	0.06	:	ND	
delta-BHC	0.09	:	ND	
gamma-BHC	0.04	:	ND	
Chlordane	0.14	:	ND	
4,4'-DDD	0.11	:	ND	
4,4´-DDE	0.04	:	ND	
4,4´-DDT	0.12	;	ND	
Dieldrin	0.02	:	ND	
Endosulfan I	0.14	:	ND	
Endosulfan II	0.04	:	ND	
Endosulfan sulfate	0.66	:	ND	
Endrin	0.06	:	ND	
Endrin aldehyde	0.23	:	ND	
Heptachlor	0.03	:	ND	
Heptachlor epoxide	0.83	:	ND	
Toxaphene	2.40	:	ND	
PCB-1016	0.65	:	ND	
PCB-1221	0.65	:	ND	
PCB-1232	0.65	:	ND	
PCB-1242	0.65	:	ND	
PCB-1248	0.65	:	ND	
PCB-1254	1.30	:	ND	
PCE-1260	1.30	:	2.48	

Very DO

ND = NOT DETECTED

Kevin L. Fillmore



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20106003-1

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE RECEIVED: 1-6-92 DATE SAMPLED: 1-6-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

PARAMETER	METHOD	DET. LIMIT	CONC.
:	•	: (mg/L)	: (mg/L)
: Total Metals	:	:	:
: Antimony	: EPA 200.7	: 0.06	: ND
Arsenic	: EPA 206.2	: 0.0047	: 5.39
Barium	: EPA 200.7	: 0.032	: 12.1
Beryllium	: EPA 200.7	: 0.001	: 0.018
_ Cadmium	: EPA 200.7	: 0.005	: 0.014
Chromium	: EPA 200.7	: 0.008	: 0.398
Copper	: EPA 200.7	: 0.009	: 2.17
Lead	: EPA 239.2	: 0.0032	: 9.62
Mercury	: EPA 245.1	: 0.0002	: ND
Nickel	: EPA 200.7	: 0.015	: 1.40
Selenium	: EPA 270.2	: 0.0022	: ND
Silver	: EPA 200.7	: 0.008	: ND
Thallium	: EPA 279.2	: 0.0037	: ND
Zinc	: EPA 200.7	: 0.008	: 8.42
	:	:	:
	:	:	:
	•	•	

= NOT DETECTED NA = NOT APPLICABLE

uality nalytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation REPORT #: 20106003-2

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE RECEIVED: 1-6-92

DATE SAMPLED: 1-6-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

H	PARAMETER	METHOD	DET. LIMIT	CONC.
:		:	: (mg/L)	: (mg/L)
:		:	;	:
: 4	Ammonia	: EPA 350.1	: 0.1	: 2.30
: F	Biochemical	: EPA 405.1	: 1.0	: 130
:	Oxygen Demand	:	:	:
: (Chemical Oxygen	: EPA 410.4	: 5.0	: 350
_:	Demand	;	:	:
	Cyanide, Total	: EPA 335.2	: 0.01	: ND
- : (Dil & Grease	: EPA 413.1	: 0.2	: 1,310
: <u>p</u>	PΗ	: EPA 150.1	: NA	: 6.61
: I	Phenolics	: EPA 420.1	: 0.05	: 0.500
: 5	Sulfide, Total	: EPA 376.2	: 0.1	: ND
: 7	Total Organic	: EPA 415.1	: 0.05	: 122
:	Carbon	:	:	:
: 7	Total Petroleum	: EPA 418.1	: 10	: 3,150
:	Hydrocarbons	:	:	:
: 3	Total Suspended	: EPA 160.2	: 4.0	: 1,250
:	Solids	:	:	:
:		:	:	:

D = NOT DETECTED NA = NOT APPLICABLE

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1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20106003-3

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003 DATE RECEIVED: 1-6-92

DATE SAMPLED: 1-6-92 SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

VOLATILE ORGANIC COMPOUNDS - EPA 624					
PARAMETER		DET. LI	MIT (ug/L)		CONC. (ug/L)
Benzene	:	250		:	402
Benzene Bromodichloromethane	:	250		:	ND
	•	250		:	ND
Bromomethane	:	500		:	ND
	:	250		:	ND
Chlorobenzene	:	250		:	ND
Chloroethane	:	500		:	ND
2-Chloroethylvinyl ether	:	500		:	ND
Chloroform	:	250		:	ND
Chloromethane	:	500			ND
Carbon tetrachloride Chlorobenzene Chloroethane 2-Chloroethylvinyl ether Chloroform Chloromethane Dibromochloromethane	:	250			ND
1,2-Dichlorobenzene	:	250			ND
1,3-Dichlorobenzene	:	250			ND
1,4-Dichlorobenzene	:	250			ND
1,1-Dichloroethane	:	250			ND
Dibromochloromethane 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,1-Dichloroethane 1,2-Dichloroethane	:	250			ND
1,1-Dichloroethene trans-1,2-Dichloroethene	:	250		:	ND
trans-1,2-Dichloroethene	:	250		;	ND
1,2-Dichloropropane	:	250		:	ND
cis-1,3-Dichloropropene	:	250		:	ND
trans-1,3-Dichloropropene	:	250		:	ND
Fthyl hangane		250		:	396
Methylene chloride	:	250		:	ND
Methylene chloride 1,1,2,2-Tetrachloroethane Tetrachloroethene Toluene	:	250		:	ND
Tetrachloroethene	:	250		:	ND
Toluene	:	250		:	2,070
1.1.1-Trichloroethane	:	250		:	ND
1,1,2-Trichloroethane Trichloroethene	:	250		:	ND
Trichloroethene	:	250		:	ND
Trichlorofluoromethane Vinyl chloride	:	500		:	ND
Vinyl chloride	:	500		:	ND

ND = NOT DETECTED

Kevin I. Fillmore

^{*} TENATIVELY IDENTIFIED COMPOUND

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation REPORT #: 20106003-4

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE SAMPLED: 1-6-92

SAMPLE IDENTIFICATION: Water - MW #5

DATE RECEIVED: 1-6-92

SAMPLED BY: Charles West

SEMI-VOLATILE ORGANIC COMPOUNDS - EPA 625

PARAMETER	DET. LIMIT (ug/L)	CONC. (ug/L)
Acenaphthene	10	: 23.4
Acenaphthylene	10	: ND
Anthracene	10	: 11.3
Benzo(a)anthracene	10	: ND
Benzo(b)fluoranthene	10	: ND
Benzo(k)fluoranthene	10	: ND
Benzo(a)pyrene	10	: ND
Benzo(ghi)perylene	10	: ND
Benzyl butyl phthalate	10	: ND
Bis(2-chloroethyl) ether	10	: ND
Bis(2-chloroethoxy) methane	10	: ND
Bis(2-ethylhexyl) phthalate	10	: 27.3
Bis(2-chloroisopropyl) ether	10	: ND
4-Bromophenyl phenyl ether	10	: ND
2-Chloronaphthalene	10	: ND
4-Chlorophenyl phenyl ether	10	: ND
Chrysene	10	: ND
Dibenzo(a,h)anthracene	10	: ND
Di-n-butylphthalate	10	: ND
1,3-Dichlorobenzene	10	: ND
1,2-Dichlorobenzene	10	: ND
1,4-Dichlorobenzene	10	: ND
3,3'-Dichlorobenzidine	20	: ND
Diethyl phthalate	10	: ND
Dimethyl phthalate	10	: ND
2,4-Dinitrotoluene	10	: ND

ND = NOT DETECTED

* TENATIVELY IDENTIFIED COMPOUND

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation REPORT #: 20106003-4

: Kansas City, MO

DATE: 1-23-92

ATTN: Ken Brooks

- PAGE 2 -

SEMI-VOLATILE ORGANIC COMPOUNDS - EPA 625

PARAMETER	DET. LIMIT (ug/L)		CONC. (ug/L)
2,6-Dinitrotoluene	10	:	ND
Di-n-octylphthalate	10	:	ND
Fluoranthene	10	:	ND
Fluorene	10	:	36.5
Hexachlorobenzene	10	:	ND
Hexachlorobutadiene	10	:	ND
Hexachloroethane	10	:	46.9
Indeno(1,2,3-cd)pyrene	10	:	ND
Isophorone	10	:	ND
Naphthalene	10	:	253
Nitrobenzene	10	:	ND
N-Nitrosodi-n-propylamine	10	:	ND
Phenanthrene	10	:	122
Pyrene	10	:	ND
1,2,4-Trichlorobenzene	10	:	ND
4-Chloro-3-methylphenol	20	:	ND
2-Chlorophenol	10	:	ND
2,4-Dichlorophenol	10	:	ND
2,4-Dimethylphenol	10	;	38.6
2,4-Dinitrophenol	50	:	ND
2-Methyl-4,6-dinitrophenol	50	:	ND
2-Nitrophenol	10	:	ND
4-Nitrophenol	50	:	ND
Pentachlorophenol	50	:	ND
Phenol	10	;	ND
2,4,6-Trichlorophenol	10	:	ND

ND = NOT DETECTED
* TENATIVELY IDENTIFIED COMPOUND

Kevin I. Fillmore

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation REPORT #: 20106003-5

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE SAMPLED: 1-6-92

SAMPLE IDENTIFICATION: Water - MW #5

DATE RECEIVED: 1-6-92

SAMPLED BY: Charles West

PESTICIDES	AND	PCBS	- EPA	608
------------	-----	------	-------	-----

PARAMETER	DET. LIMIT (ug/L)	CONC. (ug/L)	
Aldrin	0.04	: ND	
alpha-BHC	0.03	: ND	
beta-BHC	0.06	: ND	
delta-BHC	0.09	: ND	
gamma-BHC	0.04	: ND	
Chlordane	0.14	: ND	
4,4'-DDD	0.11	: ND	
4,4´-DDE	0.04	: ND	
4,4^-DDT	0.12	: ND	
Dieldrin	0.02	: ND	
Endosulfan I	0.14	: ND	
Endosulfan II	0.04	: ND	
Endosulfan sulfate	0.66	: ND	
Endrin	0.06	: ND	
Endrin aldehyde	0.23	: ND	
Heptachlor	0.03	: ND	
Heptachlor epoxide	0.83	: ND	
Toxaphene	2.40	: ND	
PCB-1016	0.65	: ND	
PCB-1221	0.65	: ND	
PCB-1232	0.65	: ND	
PCB-1242	0.65	: ND	
PCB-1248	0.65	: ND	
PCB-1254	1.30	: ND	
PCB-1260	1.30	: ND	

ND = NOT DETECTED

luality Inalytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation REPORT #: 20113002-1

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20113002

DATE RECEIVED: 1-13-92

SAMPLED BY:

DATE SAMPLED: 1-6-92

SAMPLE IDENTIFICATION: Water - Trip Blank

PARAMETE	R ME	THOD	DET. LIMIT	CONC.
:	:	:	(mg/L) :	(mg/L)
: Total Met	tals :	:	:	
: Antimony	7 : EP	A 200.7 :	0.06 :	ND
: Arsenic	: EP	A 206.2 :	0.0047 :	ND
: Barium	: EP	A 200.7 :		ND
: Berylliu	ım : EP	A 200.7 :	0.001 :	ND
: Cadmium	: EP	A 200.7 :	0.005 :	ND
Chromiun	n : EP	A 200.7 :	0.008 :	ND
. Copper	: EP	A 200.7 :	0.009 :	ND
: Lead	: EP	A 239,2 :		ND
: Mercury	: EP	A 245.1 :	0.0002 :	ND
: Nickel	: EP	A 200.7 :	0.015 :	0.022
: Selenium	a : EP	A 270.2 :	0.0022 :	ND
: Silver	: EP			ND
: Thallium	n : EP	A 279.2 :	0.0037 :	ND
: Zinc	: EP	A 200.7 :	0.008 :	ND
:	;	:	:	
:	:	:	:	
:	:	:	:	

ID = NOT DETECTED NA = NOT APPLICABLE



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20113001-1

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20113001

DATE RECEIVED: 1-13-92

DATE SAMPLED: 1-13-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Oil - MW2 ISC KC

PARAMETER	METHOD	DET. LIMIT	CONC.
:	:	:	:
: Flash Point	: SW-846-1010	: NA	: >220 F
:	:	:	:
: Halogens	: SW-846-9076	: 10 mg/Kg	: 217 mg/Kg
: : PCBs :	: SW-846-8080 :	: : 2.0 mg/Kg :	: : 2.09 mg/Kg : (Aroclor 1260)
: Total Metals	: SW-846-3050	: :	: :
: Arsenic	:	:	:
	: SW-846-6010	: 5.0 mg/Kg	: ND
: Cadmium	:	:	:
	: SW-846-6010	: 0.25 mg/Kg	: ND
: Chromium	:	:	:
	: SW-846-6010	: 0.4 mg/Kg	: ND
:	:	:	:
: Lead	: SW-846-6010	: 2.7 mg/Kg	: 6.59 mg/Kg
:	:	:	:
:	;	:	:

ND = NOT DETECTED NA = NOT APPLICABLE

nalytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation REPORT #: 20113001-2

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20113001

DATE RECEIVED: 1-13-92

DATE SAMPLED: 1-13-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Oil - MW2 ISC KC

	VOLATILE	ORGANI	C COM	POUNDS	- EPA 62	4	
	PARAMETER		DET.	LIMIT	(ug/L)		CONC. (ug/L)
	Benzene	:	300	···		:	34,100
	Bromodichloromethane	:	300			:	ND
	Bromoform	;	300			:	ND
	Bromomethane	:	600			:	ND
	Carbon tetrachloride	:	300			:	ND
		;				:	300
	Chloroethane	:	600			:	ND
	2-Chloroethylvinyl ether	:	600			:	ND
	Chloroform	;	300			:	ND
	Chloroform Chloromethane	:	600			:	ND
	Dibromochloromethane	:	300			:	ND
	1,2-Dichlorobenzene					:	ND
K	1,3-Dichlorobenzene	:	300			:	ND
Ç	1,4-Dichlorobenzene	;	300			:	ND
	1,1-Dichloroethane	;	300			:	ND
	1,4-Dichlorobenzene 1,1-Dichloroethane 1,2-Dichloroethane	;	300			:	1,070
	1,1-Dichloroethene trans-1,2-Dichloroethene 1,2-Dichloropropane cis-1,3-Dichloropropene trans-1,3-Dichloropropene	:	300				ND
	trans-1,2-Dichloroethene	:	300			:	ND
	1,2-Dichloropropane	:	300			:	ND
	cis-1,3-Dichloropropene	:	300			:	ND
	trans-1,3-Dichloropropene	:	300				ND
	Ethyl benzene	:	300			:	13,000
	Ethyl benzene Methylene chloride	:	300			:	12,400
	1,1,2,2-Tetrachloroethane	:	300				ND
	Tetrachloroethene	:	300			:	1,900
	Toluene	:	300				45,700
	1,1,1-Trichloroethane					:	16,800
	1,1,2-Trichloroethane						ND
		:				:	2,670
	Trichlorofluoromethane	:	600			:	ND
	Vinyl chloride	:	600			:	ND

ND = NOT DETECTED

^{*} TENATIVELY IDENTIFIED COMPOUND

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

: 1633 South Marsh

: Kansas City, MO 64126

REPORT #: 20113002-2

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20113002 DATE RECEIVED: 1-13-92

DATE SAMPLED: 1-6-92 SAMPLED BY:

SAMPLE IDENTIFICATION: Water - Trip Blank

	VOLATILE	ORGANIC COMPOUNDS - EPA 624	:	
	PARAMETER	DET. LIMIT (ug/L)		CONC. (ug/L)
	Benzene	5	:	ND
	Bromodichloromethane	5	:	ND
	Bromoform	5	:	ND
	Bromomethane	10	:	ND
	Carbon tetrachloride	5	:	ND
)	Chlorobenzene	5	:	ND
	Chloroethane	10	;	ND
*	2-Chloroethylvinyl ether	10	:	ND
	Chloroform	5	:	ND
	Chloromethane	10	:	ND
	Dibromochloromethane	5	:	ND
ĸ	1,2-Dichlorobenzene	5	:	ND
	1,3-Dichlorobenzene	5	:	ND
	1,4-Dichlorobenzene	5	:	ND
	1,1-Dichloroethane	5	:	ND
	1,2-Dichloroethane	5	:	ND
	1,1-Dichloroethene	5	:	ND
	trans-1,2-Dichloroethene	5	:	ND
	1,2-Dichloropropane	5	:	ND
	cis-1,3-Dichloropropene	5	:	ND
	trans-1,3-Dichloropropene	5	:	ND
	Ethyl benzene	5 5 5 5 5 5 5 5 5 5	:	ND
	Methylene chloride	5	:	ND
	1,1,2,2-Tetrachloroethane	5	:	ND
	Tetrachloroethene	5	:	ND
	Toluene	5	:	ND
	1,1,1-Trichloroethane	5	:	ND
	1,1,2-Trichloroethane	5	:	ND
	Trichloroethene	5	:	ND
ĸ	Trichlorofluoromethane	10	:	ND
	Vinyl chloride	10	:	ND

ND = NOT DETECTED

* TENATIVELY IDENTIFIED COMPOUND

APPENDIX A-4 WASTE ANALYSIS PLAN

APPENDIX A4

1.0 QUALITY CONTROL/WASTE ANALYSIS PLAN

FOR

INDUSTRIAL SERVICE CORPORATION

KANSAS CITY, MISSOURI

1.1 INTRODUCTION

The following methodology was developed to meet State and Federal regulations governing the sampling and analysis of incoming waste oil and outgoing specification used oil. The waste oil is transported to the ISC facility in Kansas City from three different sources:

- 1) Tank trucks transport waste oil from local clients.
- 2) Over-the-road trucks transport waste oil from other ISC facilities.
- 3) Broker oil trucks transport waste oil purchased from independent waste oil haulers.

1.2 INCOMING WASTE OIL ANALYSES

The following analyses are conducted on the following incoming waste oil streams:

Local Waste Oil and Over-the-Road Waste Oil

- 1) Total halogens; EPA Method 9076, SW-846
- 2) PCB's; EPA Method 8080, SW-846 (with acid rinse cleanup)

Broker Oil

1) Total Halogens; EPA Method 9076, SW-846

1.3 LOCAL WASTE OIL AND OVER-THE-ROAD WASTE OIL

As a method for testing the waste oil delivered daily to the ISC facility by tank trucks, all tank trucks and over-the-road trucks are emptied into one daily composite storage tank (tank #1, tank #2, tank #3, tank #4 or tank #5). Typically, the designated daily storage tank receives waste oil from tank trucks from 3:00 pm until 3:00 pm the next day. After 3:00 pm (following one complete day's storage), a composite sample is taken from the tank (utilizing all sample lines), labeled, and taken to the laboratory for analysis. Any trucks which arrive after 3:00 pm are emptied into the next day's storage tank.

1.4 BROKER OIL

Broker oil which is brought to the ISC site by transport truck is analyzed separately. A sample is taken from each truck and split. One split sample is given to the driver and the other split sample is tested by ISC. This sample is tested immediately (approximately 1 hour) for total halogens. If the test results show a total halogen concentration greater than 1000 ppm, then the waste oil is not accepted. If the test sample shows a total halogen concentration less than 1000 ppm, then the truck load is accepted and the waste oil is pumped into the daily composite storage tank. This oil subsequently undergoes retesting as specified in Section 1.3.

1.5 TESTING PROCEDURES

The composite storage tank is tested daily for total halogens and PCB's after 3:00 pm or when the daily composite tank becomes full. Test analyses are completed prior to the emptying of the tank into the process system. If two or more tanks are utilized during the day, a composite sample is collected from each tank and submitted to the ISC laboratory.

I.S.C. - KCMO Closure WKPlan - Rev.0 May 15, 1992 Page A4-3

1.6 REJECTING WASTE OIL

All ISC drivers are equipped with a portable hand-held instrument (TIF 5500-A Pump Style Automatic Halogen Leak Detector), which indicates the presence of halogenated solvents in waste oil. These instruments are used at the customer's location as a screening tool to indicate the presence of halogenated solvents. If, after using the halogen detector, there is uncertainty concerning the halogen level of a customer's waste oil, ISC drivers have been instructed to obtain a representative sample for laboratory analysis. This sample is analyzed before the waste oil can be loaded and transported (see Section 1.7: "Process Oil" for interpretation of analytical results).

ISC does not accept waste oil which contains over 1000 ppm of total halogens. If the composite sample contains more than 4000 ppm of total halogens or contains PCBs in concentrations greater than 2 ppm, the daily composite tank (approximately 20,000 gallons) is classified as a hazardous waste, and manifested for disposal to an approved hazardous waste incinerator. Composite samples that contain between 1000 and 4000 ppm total halogens are given the rebuttal presumption test as defined in 40 CFR Part 266 Subpart E.

1.7 PROCESS OIL

Outgoing processed oil is analyzed for specification Used Fuel Oil parameters as defined in 40 CFR 266.40. The following parameters, test methods and limitations define the marketed product:

	<u>Parameter</u>	<u>Method</u>	Specification <u>Level</u>
1)	Total halogens:	Method 9076; SW-846	1000 ppm
2)	Arsenic:	Method 3040/200.7 (SW-846)	5 ppm
3)	Cadmium:	Method 3040/200.7 (SW-846)	2 ppm
4)	Chromium:	Method 3040/200.7 (SW-846)	10 ppm
5)	Lead:	Method 3040/200.7 (SW-846)	100 ppm
6)	Flash point:	ASTM D-93	100°F

I.S.C. - KCMO Closure WKPlan - Rev.0 May 15, 1992 Page A4-4

In addition to the analytical testing described above, all outgoing processed oil is analyzed for PCB's, with results submitted to the MDNR regional office (Kansas City, MO) on a monthly basis.

A composite sample is collected from Tank #28 twice each week and analyzed for the parameters in the preceding table by the ISC laboratory or a local commercial laboratory.

ISC will keep on file (for each invoice of Specification Used Oil Fuel) a copy of the test analysis run for that particular batch of process oil from the process storage tank, for the period of time required by law.

1.8 ANALYTICAL INSTRUMENTATION

Analytical instruments currently maintained by Quality Analytical Services (ISC lab) and summary of capabilities are:

Organic Instrumentation

Finnigan MAT 4500 GC/MS/DS (Quadrupole) - Purchased 1988

- Dedicated to semi-volatile, extractable organic analyses
- Equipped with Varian 8000 Autosampler

Finnigan MAT OWA (1050) GC/MS/DS (Quadrupole) - Purchased 1986

- Dedicated to volatile organic analyses
- Equipped with Tekmar LSC-2 Purge & Trap Sample Concentrator

Hewlett-Packard 5890A Gas Chromatograph - Purchased 1986

- Dedicated to PCB analyses of oil matrices & FID screening
- Equipped with ECD & FID systems

Hewlett-Packard 5890A Series II Gas Chromatograph - Purchased 1989

- Performs pesticide/herbicide analyses on water and soils
- Equipped with dual ECD.

I.S.C. - KCMO Closure WKPlan - Rev.0 May 15, 1992 Page A4-5

Metals Instrumentation

Perkin-Elmer Model 6500 ICP/DS - Purchased 1987

- Performs metals analyses not requiring low detection limits
- Equipped with P-E Autosampler

Perkin-Elmer Model 5000 AA/DS - Purchased 1987

- Performs metal analyses with critical detection limits
- Equipped with HGA 500 Graphite frame and P-E autosampler

Perkin-Elmer Model 460 AA - Purchased 1988

- Performs mercury analyses with MHS-10 hydride system
- Performs flame determination of metals

Miscellaneous Instrumentation

Dohrman DC-80 Total Organic Carbon Analyzer -	Purchased 1986
Dohrman DX-20 Total Organic Halogen Analyzer	- Purchased 1986
Dohrman C-300 Total Organic Halogen Analyzer -	Purchased 1986
Princeton/Gamma-Tech X-Ray Chemical Analyzer	- Purchased 1987
Orion EA-940 Specific Ion Electrode Meter -	Purchased 1987
Zymark Turbo Vap Organic Evaporator -	Purchased 1989
Finnigan MAT-Formaster software w/Kaypro 286 F	PC - Purchased 1988
IBM/XT Compatible PC -	Purchased 1989

1.9 HAZARDOUS WASTE

ISC does not knowingly accept waste known to be a hazardous waste. See previous sections for analytical procedures used to augment this statement.

1.10 DISPOSAL PLAN FOR RESIDUAL WASTE

The following items are generated waste from the ISC process system (see Process Flowsheet, Figure 1):

1) Storm runoff which mixes with on-site waste oil (from leaking valves, etc.)

- 2) Sedimentation/sludge built up in waste oil storage tanks.
- 3) Sludge built up in heat/sedimentation tanks (cookers).
- 4) Condensate from Vapor Recovery System.

The storm runoff water is stored in the 22,000 gallon retention basin located in the northwest corner of the site. Currently, the water is being transported to the Kansas City, Kansas Water Pollution Control Department sludge discharge sump pit, located at 2nd and Oakland, Kansas City, Kansas. Attached to the back of this section is a copy of the Agreement between the Water Pollution Control Department of Kansas City, Kansas and Industrial Service Corp. An activated carbon water treatment unit is currently being evaluated and a unit will be purchased and installed shortly after evaluation is completed.

The sediment and sludge build-up in the waste oil storage tanks are disposed by incineration. The "tank bottoms" are tested for Btu content and transported with manifest to the Systech concrete kiln permitted to incinerate hazardous waste, which is located near Fredonia, Kansas.

Sludges which build in the heat/sedimentation tanks (cookers) are tested for Btu content, manifested and transported to the Systech concrete kiln incinerator near Fredonia, Kansas for disposal.

The water condensate from the Vapor Recovery System is transported to the Kansas City, Kansas Water Pollution Control Department's sludge discharge sump pit located at 2nd and Oakland.

The hydrocarbon vapor/light ends condensate from the Vapor Recovery System is added to processed oil (see Section 3.0).

APPENDIX A-5

MEMORANDUM OF AGREEMENT

(Between I.S.C. and Kansas City, Kansas Water Pollution Control Department)

Industrial Service Corporation

P.O. Box 3249

Shawnee, Ks. 66203

- \(913) 631-3300

Fax No. (913) 631-1339

June 4, 1990

Bruce M. Browne, P.E., Dir. Water Pollution Control Dept. 701 N. 7th St. Kansas City, Ks. 66101

Re: Industrial Service Corporation

Memorandum of Agreement

Dear Mr. Browne:

This letter is a Memorandum of Agreement by and between the Water Pollution Control Department of Kansas City, Kansas and Industrial Service Corporation.

The Water Pollution Control Department agrees to receive and treat chemical wastes from Industrial Service Corporation operations under the following terms and conditions:

- 1. Concentrations of substances in the wastes shall not exceed those shown on Attachment "A", which is attached and made a part of this Agreement.
- 2. Industrial Service Corporation (ISC) shall deliver all wastes in an approved watertight vehicle to the Water Pollution Control Department's sludge discharge sump pit at Kansas City, Kansas Pump Station NO. 2 located at 2nd & Oakland or at other locations designated by the Water Pollution Control Department.
- Pollution Control Department.

 3. Any spills of wastes onto City streets or at the sump pit will be thoroughly flushed and cleaned up by ISC.
- 4. ISC shall maintain all necessary City or Health Department permits for liquid waste hauling.
- 5. ISC shall deliver o more than 1,500 gallons of waste at any one time and shall discharge the waste at the sump pit at a rate not exceeding 1,500 gallons per hour (25 gallons per minute).
- 6. The maximum quantity of waste that the Water Pollution Control Department will accept shall be no greater than 30,000 gallons per month averaged over a ninety (90) day

Mr. Bruce M. Browne, P.E. June 4, 1990 Page Two

- 7. At least once a month ISC will bring one truck load of wastes to the Water Pollution Control Department's laboratory at 50 Market Street for sampling and testing. At least once every six months, ISC will provide a complete analysis and concentration from a qualified laboratory of all organic compounds in the waste.
- 8. If concentrations of priority pollutants, as listed by the Environmental Protection Agency, and of oil and grease are found to exceed the limits as shown on Attachment "A", ISC will pay any additional charges to the Water Pollution Control Department to recover increased costs of treating the wastes.
- 9. Under the terms and conditions recited above, Industrial Service Corporation agrees to pay the Water Pollution Control Department a monthly fee of \$920.00. Payment shall be made in advance for the succeeding month. Failure to make payment within thirty (30) days of the due date automatically terminates the Agreement. No billing or invoices will be made by the Water Pollution Control Department.
- 10. This Agreement shall be in force for one year beginning on July 1, 1990. This Agreement may be renewed at the consent of both parties at new fee schedules or other conditions that may be mutually agreed upon.

11. This Agreement may be canceled by either party upon sixty (60) days notice.

INDUSTRIAL SERVICE CORPORATION

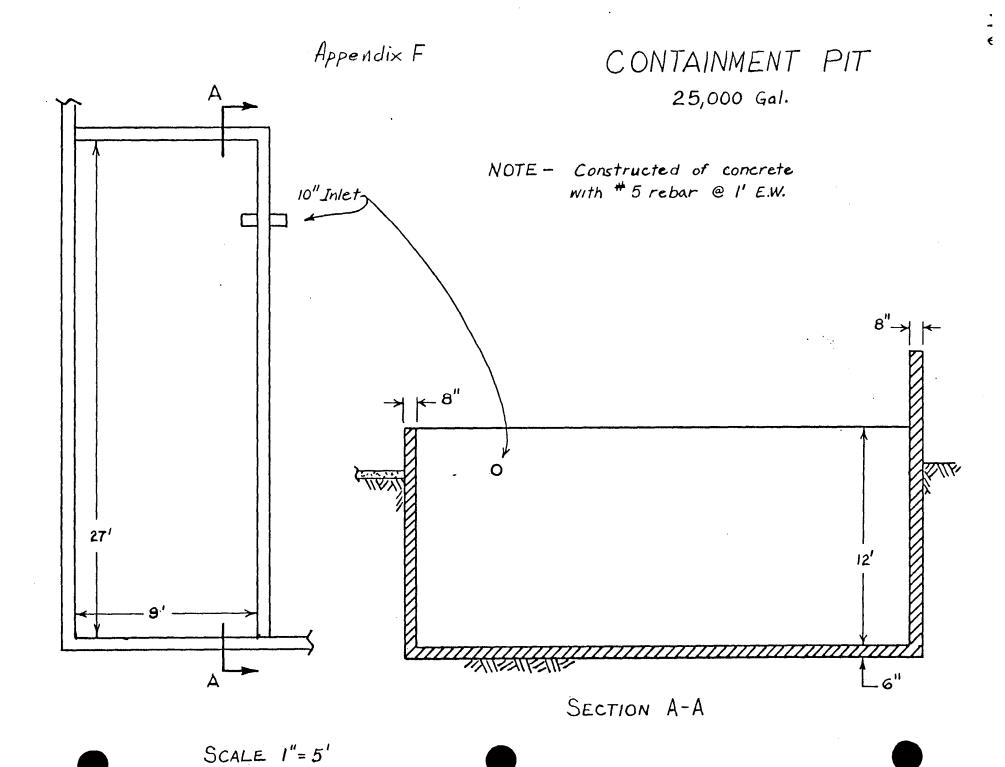
Ronald Dexfenbaugh

Accepted by:

Brace M. Browne, P.E. Director

APPENDIX A-6

CONTAINMENT PIT DESIGN



APPENDIX A-7

NOTICE OF VIOLATION

AND

REPORT OF INVESTIGATION

JANUARY 5, 1988

MISSOURI DEPARTMENT OF NATURAL RESOURCES

NOTICE OF VIOLATION PURSUANT TO REQUIREMENTS OF THE MISSOURI HAZARDOUS WASTE MANAGEMENT LAW, RULES AND REGULATIONS

1427

idium Petroleu	m Co. unc.				
ADDRESS 1633 South MAR	sh KAWSAS	C;+4	STATE	6412L	
MISSOURI ID NUMBER		DATE OF WOPECTION IN	V65TI GATION		
O1813 During an inspection and/or a	review of information or docu	mentation completed this	date to determine co	moliance with the	
requirements of the Missouri Ha	zardous Waste Management Lav	w, Section 260.350 - 260.550	ORSMo, and/or the Rul	es and Regulations	
10 CSR 25 the following violation Missouri Hazardous Waste Requ		CFR regulations cited belo	w have been adopted	by reference in the	
CITATION	iations.	DESCRIPTION C	F VIOLATION		
40 CFR 265. 1	12 COMMENC	ing Closure	Activity D	ithout	
	Subn:	Hing Amen Fication.	DED PLAN E) R	
	Not:	Pication.	·	***	
				·	
			<u></u>		
This information is provided to c constitute a compliance order iss be identified as a result of this in:	sued pursuant to Section 260.410	of noncompliance at the e. D, RSMo and may not be a c	arliest possible time. The omplete listing of all vices	nis notice does not plations which may	
The owner/operator is hereby reactions taken and/or a schedule Management Program, Department Ausas	for completion of necessary co	orrective actions to be take Box 176, Jefferson City, MC	en to: Chief, Enforceme D 65102 with a copy to	ent Section, Waste the Administrator,	
The corrective actions taken within 15 days of this notice will be considered in determining whether enforcement action, including the assessment of civil penalties, should be initiated.					
If you have any questions on this at 314/751-2176 or h	If you have any questions on this notice or wish to discuss your response, you may call Mr. Tom Judge at 314/751-2176 or Ms. Sandra Carroll at Same				
at 314/751-2176 or Ms. SANDIN CACCOII at SAME Signature of Preparer 1/29/88					
The undersigned person hereby acknowledges that he/she received a copy of this Notice and has read same.					
SIG RE .		PRINTED NAME	00.1.	:	
. :		ROJAID D	etterbaugh		
President - Radium	Petroloum	DATE			
174 Chi di 14	, = 5 -	1		!	





STATE OF MISSOURI DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey.
Division of Management Services
Division of Parks, Recreation,
and Historic Preservation

CERTIFIED MAIL

January 29, 1988

Mr. Ronald Deffenbaugh, President Radium Petroleum Company, Inc. Box 6206 Kansas City, MO 64126

Dear Mr. Deffenbaugh:

Attached please find a report of the investigation conducted December 22, 1987 to determine the status of the Radium Petroleum tank farm area at 1633 South Marsh in Kansas City. This report notes that closure or partial closure has been conducted without a closure plan being approved for this facility. In addition, this activity apparently took place without the required notification being made. These violations are cited in the attached Notice of Violation (#1427). Please make a timely response to the Notice as indicated.

An appropriate response to the Notice would be a detailed description and report of all closure activities taken, including a detailing of all things done to the site and what has been done with all materials resulting from closure activities. Were any wastes in inventory? What was done with them? What has been broken down or dismantled? What has been done with that material? What has been excavated? What has been done with that material? Was any testing done prior to or during closure? What were the results? Has anything been added or changed at the site?

Mr. Ronald Deffenbaugh January 29, 1988 Page 2

I believe this letter is self-explanatory, but please feel free to contact Mr. Tom Judge of this office at 314-751-3176 if further information or assistance is required.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

Arthur H. Groner, Chief

Enforcement Section

Waste Management Program

AHG:tjt

Enclosures

cc: Mr. Richard Rhyne, Craft, Fridkin, Shaffer, & Rhyne

Mr. C. Wayne Case, Deffenbaugh Industries

Mr. Dan Swyers, Deffenbaugh Industries

3.600 Jackson County Radium Petroleum Company

REPORT OF INVESTIGATION JANUARY 5, 1988

FACILITY

Radium Petroleum Company 1633 South Marsh Avenue Kansas City, Missouri 64126

MO Generator ID#: 01813 MO Transporter ID#: NA MO Resource Recovery ID#: RR-004 EPA ID#: MOD073027609 816-833-1919

PARTICIPANTS

Department of Natural Resources:

Mr. Keith Bertels

Environmental Specialist

Mr. John Schofield

Environmental Specialist

Deffenbaugh Industries, Inc.:

Mr. Dan Swyers

Environmental Engineer

Mr. Bob Vantuyl

Environmental Engineer

INTRODUCTION

This investigation was performed on December 22, 1987, at the request of the Missouri Department of Natural Resources Waste Management Program to determine the current status of the Radium Petroleum Company tank farm area.

INVESTIGATION PROCEDURES AND FINDINGS

After a brief meeting, a tour of the tank farm area was made. The tank farms lies due north of Radium's administrative office and garage. An area immediately north of the administrative office has been upgraded (photograph 1). That is, all underlying contaminated

3.600 Jackson County Radium Petroleum Company Report of Investigation

January 5, 1988 Page 2 of 3 pages

soil has been removed and replaced with an approximately 1-2 feet thick concrete pad. Ten (10) 20,000-gallon and one (1) 100,000-gallon tanks sit on the pad. The tanks are numbered and are storing various products: 5 tanks (20 K gallon) waste oil, one tank (20 K gallon) hydraulic oil, one tank (20 K gallon) diesel, one tank (100 K gallon) processed oil and 4 tanks (20 K gallon) diesel, one tank (100 K gallon) processed oil and 4 tanks (20 K gallon) not in service. (Note: A 147 K waste oil storage tank lies due east of the administration building. It sits on the same pad described above.)

The middle portion of the tank farm is in the process of being upgraded (photograph 2). All tanks have been removed and are being stored east of the tank farm along the cliff (photograph 3). In the very near future, Radium will be excavating all contaminated soil/gravel. This soil/gravel at this time will be disposed at the Johnson County Sanitary Landfill. To date, approximately 210 cubic yards of contaminated soil and gravel have been removed off-site. The exact amount is on file at the Johnson County Sanitary Landfill.

The western-most portion of the tank farm (with the exception of the three (3) 20 K gallon "composite" tanks which receive incoming waste oil) has undergone no change since at least 1984 or 1985 (photograph 2). (Note: This does not include the repair of the retaining wall or installation of the fence.) The installation of the composite tanks is noted in previous inspection reports and/or correspondence (e.g. resource recovery application).

Mr. Swyers was asked about the decontamination of the tanks. He stated the empty tanks will be tested using ultra sound techniques and placed back into service. Mr. Swyers was also asked about analysis performed on soil/gravel. Mr. Vantuyl stated that E.P. Toxic metals, PCBs, total halogens and oil and grease were the parameters tested to characterize the waste.

Based on observation made during the site visit, it appears that Radium is in the process of closing or partial closure of the facility. Kansas City Regional Office file records do not indicate Radium has approval from the Department to close or partially close the facility. It was indicated during the course of the inspection to Mr. Swyers that there is a closure approval process and public comment period.

3.600 Jackson County Radium Petroleum Company Report of Investigation

January 5, 1988 Page 3 of 3 pages

Mr. Swyers initiated a conversation concerning the resource recovery application. Previously there was some discussion of the Vapor Recovery System (VRS). In this previous discussion, Mr. Swyers stated the vapor recovery system would be completely installed when the whole tank farm area is upgraded. In the prior resource recovery application, the vapor recovery system was shown to be installed and in operation. It was recommended to Mr. Swyers that any resource recovery application submitted to the Department should reflect the current operation not anticipated modifica-When the vapor recovery system is about to be completely finished and operational, Radium should submit a revised resource recovery application. This should, however, be discussed with Ms. Rice (or the resource recovery engineer). Mr. Swyers stated the installtion of the VRS was dependent on partial closure of the facility. Upon returning to the office, a review of the soil/gravel laboratory data was made. It appears that Radium has failed to characterize the soil/gravel waste properly. There was not a priority pollutant analysis. Waste oil may contain by its nature many of the listed priority pollutants. However, in light of the fact that Radium, has handled waste chlorinated and non-chlorinated solvents, it is believed that Kadium, at a minimum, should have analyzed the soil/ gravel waste for volatile organics.

REPORT BY:

John Schofield

Environmental Specialist

APPROVED, BY:

Steve A. Johnson

Environmental Specialist

- APPROVED BY:

James R. McCónathy

Regional Administrator

ATTACHMENT 1

LABORATORY ANALYSIS LETTER OF AUTHORIZATION — JOHNSON COUNTY



April 30, 1987

RECEIVED

MAY 1 1987

ENGINEERING DEPT.

Radium Petroleum Company Attn: Mr. Romald D. Deffenbaugh, President 1633 South Marsh, Box 6206 Kansas City, Missouri 64126

Re: Johnson County Industrial Solid Waste Disposal Authorization Number 87-92

Dear Mr. Deffenbaugh:

We are in receipt of your letter of April 16, 1987, requesting to dispose of approximately 250 cubic yards of oil contaminated gravel. Information you supplied indicated the waste is mon-hazardous.

Approval is given to dispose of this waste at the Johnson County Landfill, Inc., operating under Kansas Permit 263 provided the following conditions are met:

- 1. Approval to deliver the waste must be obtained from the landfill operator prior to transporting the waste to the landfill. The final decision on whether to accept or reject the waste rests with the landfill operator. Please call Mr. Robert Vantuyl, 913/631-3300 to obtain approval. If the landfill operator refuses to accept this waste you should contact us to determine alternative disposal options.
- 2. The waste must be transported separately to the landfill and be identified to the operator upon delivery.
- 3. Kansas Administrative Regulation 28-29-23(r) requires solid waste disposal facilities to maintain a log of commercial or industrial wastes received such as sludges, liquids, and barreled waste. The log must indicate the source and quantity of waste and the disposal location thereof. The industrial waste authorization number should be used as identification when entering the shipment into the log.
- 4. Bulk liquids or sludges must be adequately containerized to prevent leakage and/or spillage of waste on roads and highways during transportation.



Solid Waste Disposal Authorization #87-92 Page 2 April 30, 1987

5. This approval is valid for a one-time shipment only of this waste to the landfill. This authorization expires April 30, 1988. If the waste has not been taken to the landfill by this date, you must apply for a new authorization.

Sincerely,

Randy O. Bradley

Randy D. Bradley Director

RDB:mb/SWA92

cc: Charles H. Linn, Chief, Solid Waste Section, KDHE Robert Vantuyl, Johnson County Landfill, Inc. Douglas L. Smith, Director of Health Services

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Fetroleum

1633 S. Marsh

Kansas City, MO 64126 DATE: 4/9/87

REPORT #: 7040914

: Bob Vantuyl attn

QAS SAMPLE #: 70316001 DATE RECEIVED: 3/31/87

SAMPLE ID: Soil samples taken from around tanks and

septic tanks. 0 - 6" deep

	FARAMETER	METHOD	DETECTION LIMIT	CONC.
<u> </u>				
	Flash Foint	ASTM D-93	NA	> 195 F
	FCBS	8080	0.2 mg/kg	מא
	Oil & Grease	503.C	0.1 %	1.1 %
	EF TOX	1310		
	Arsenic	7060	0.005 mg/l	ND
	Barium	7080	1 mg/l	4 mg/l
	Cadmium	7130	0.01 mg/l	ND
	Chromium	7190	0.05 mg/l	ND
	Lead	7420	0.5 mg/l	ND
	Mercury	747O	0.0005 mg/l	ND
	Selenium	7740	0.005 mg/l	ND
	Silver	776Ú	0.01 ma/l	0.04 mg/l

Inalytical Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Petroleum

1633 S. Marsh

Kansas City, MO 64126 DATE: 4/9/87

REPORT #: 7040913

attn : Bob Vantuyl

QAS SAMPLE #: 70316002 DATE RECEIVED: 3/31/87

SAMPLE ID: Soil samples taken from around tanks and

septic tanks. 12 - 18" deep

FARAMETER	METHOD	DETECTION LIMIT	CONC.
Flash Point	. ASTM D-93	NA	> 195 F
PCBS	8080	0.2 mg/kg	ND
Oil & Grease	503.C	0.1 %	4.5 %
EF TOX	1310		
Arsenic	7060	0.005 mg/l	ND .
Barium	7080	1 mg/l	2 mg/l
Cadmium	7130	0.01 mg/l	ND
Chromium	7190	0.05 mg/l	ND
Lead	7420	ഠ.5 my/l	ND
Mercury	7470	0.0005 mg/l	ND
Selenium	7740	0.005 mg/l	ND
Silver	7760	$0.01~\text{mg/l}_{\odot}$	0.04 mg/l

nalytical Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Fetroleum

1633 S. Marsh

Kansas City, MO 64126 DATE: 4/9/87

REFORT #: 7040914

attn : Bob Vantuyl

QAS SAMPLE #: 70316003 DATE RECEIVED: 3/31/87

SAMPLE ID: Soil samples taken from around tanks and

septic tanks. 30 - 36" deep

PARAMETER	METHOD	DETECTION	CONC.
Flash Foint	· ASTM D-93	NA	> 195 F
FCBS	8080	0.2 mg/kg	ND
Oil & Grease	503.C	0.1 %	1.1 %
EP TOX Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	1310 7060 7080 7130 7190 7420 7470 7740 7760	0.005 mg/l 1 mg/l 0.01 mg/l 0.05 mg/l 0.5 mg/l 0.0005 mg/l 0.005 mg/l	ND 2 mg/l ND ND ND ND ND ND ND ND ND



September 2, 1986

Radium Petroleum Company Attn: Mr. Robert Vantuyl Environmental Engineer 1633 South Marsh, Box 6206 Kansas City, Missouri 64126

Re: Johnson County Industrial Solid Waste Disposal Authorization Number 86-56

Dear Mr. Vantuyl:

We are in receipt of your letter of July 1, 1986, requesting to dispose of approximately 90 cubic yards of oil contaminated gravel. Information you supplied indicated the waste is non-hazardous.

Approval is given to dispose of this waste at the Johnson County Landfill, Inc., operating under Kansas Permit 263 provided the following conditions are met:

- 1. Approval to deliver the waste must be obtained from the landfill operator prior to transporting the waste to the landfill. The final decision on whether to accept or reject the waste rests with the landfill operator. Please call Mr. Robert Vantuyl, 913/631-3300 to obtain approval. If the landfill operator refuses to accept this waste you should contact us to determine alternative disposal options.
- 2. The waste must be transported separately to the landfill and be identified to the operator upon delivery.
- 3. Kansas Administrative Regulation 28-29-23(r) requires solid waste disposal facilities to maintain a log of commercial or industrial wastes received such as sludges, liquids, and barreled waste. The log must indicate the source and quantity of waste and the disposal location thereof. The industrial waste authorization number should be used as identification when entering the shipment into the log.
- 4. Bulk liquids or sludges must be adequately containerized to prevent leakage and/or spillage of waste on roads and highways during transportation.

THE CONTROL OF THE COURT OF THE

Solid Waste Disposal Authorization #86-56 Page 2 September 2, 1986

5. This approval is valid for a one-time shipment only of this waste to the landfill. This authorization expires September 2, 1987. If the waste has not been taken to the landfill by this date, you must apply for a new authorization.

Sincerely,

Randy D. Bradley

RDB:mb/SDA48

Director

cc: Charles H. Linn, P.E., Kansas Department of Health and Environment Ronald D. Deffenbaugh, Johnson County Landfill, Inc. Douglas L. Smith, Director of Health Services



Luality inalytical Services, Inc.

1633 S. Marsh • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Radium Petroleum

: 1633 S. Marsh

: Kansas City, MO 64126 DATE: 8-14-86

REPORT #: 6-8-0085

attn: Bob Vantuyl

QAS SAMPLE #: 0825

DATE RECEIVED: 5-1-86

SAMPLE ID: West Side of Tank #8 Rerun

FARAMETER METHOD DET. LIMIT CONC. Metals - EP TOX 1310 Arsenic 7060 0.05 mg/1ND Barium 7080 $0.5 \, \text{mg/l}$ ND 7130 Cadmium 0.01 mg/lND Chromium 7190 0.05 mg/lND Lead 7420 0.5 mg/lND Mercury 7470 0.0005 mg/lND Selenium 7740 0.01 mg/lND 7760 0.01 mg/l Silver ND

analytical Dervices, Inc.

1633 S. Marsh • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Radium Petroleum

: 1633 S. Marsh

: Kansas City, MO 64126 DATE: 8-14-86

REFORT #: 6-8-0087

0.01 mg/l

ND

attn: Bob Vantuyl

QAS SAMPLE #: 0827 DATE RECEIVED: 5-1-86

Silver

SAMPLE ID: UIF Heater Rerun

FARAMETER METHOD DET. LIMIT Metals - EP TOX 1310 Arsenic 7060 0.05 mg/lND 7080 Barium 0.5 mg/l ND Cadmium 7130 0.01 mg/lND Chromium 7190 0.05 mg/lND 7420 $0.5 \, \text{mg/l}$ Lead ND 0.0005 mg/l 7470 ND Mercury 7740 0.01 mg/1 ND Selenium

7760



nalytical Services, Inc.

1633 S. Marsh • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Radium Petroleum

: 1633 S. Marsh

: Kansas City, MO 64126 DATE: 8-14-86

REFORT #: 6-8-0086

0.01 mg/l

ND

attn: Bob Vantuyl

QAS SAMPLE #: 0824 DATE RECEIVED: 5-1-86

Silver

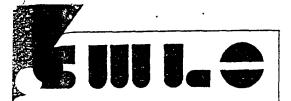
SAMPLE ID:SW Side of Tank #15 Rerun

PARAMETER METHOD DET. LIMIT CONC. Metals - EP TOX 1310 $0.05 \, \text{mg}/1$ ND Arsenic 7060 Barium 7080 0.5 mg/l ND Cadmium $0.01 \, \text{mg/l}$ 7130 ND Chromium 0.05 mg/lND 7190 $0.5 \, \text{mg/l}$ Lead 7420 ND $0.0005 \, \text{mg/l}$ ND Mercury 7470 Selenium 7740 0.01 mg/l ND

776Ü

RECEIVED

MER SHIPSONDSONE



Southwest Laboratory of Oklahoma

CLIENT:

Q.A.S., INC.

1633 MARSH

KANSAS CITY, MISSOURI 64126

ATTN: JEFF JENKINS

NUMBER 7239

DATE:

06-25-86

SUBJECT:

SOIL SAMPLE FOR PCB ANALYSIS

SWL0 #9172

DATE SUBMITTED: 6-10-86

SAMPLE I.D.

PCB - AROCHLOR

SOIL #1063...... <50.0 ug/Kg (50 PPB)*

LIMIT OF DETECTION IS 100x HIGHER THAN NORMAL SOIL EXTRACTS, SINCE THE EXTRACT WAS DILUTED BY A FACTOR OF 10 AND THE INTEGRATOR SCALE WAS LOWERED BY $10\times$.

ANALYST NOTATION:

SAMPLE (HEXANE) EXTRACT WAS VERY DILY AND DARK BROWN TO BLACK IN COLOR. WHEN CONCENTRATED AN DIL RESIDUE WAS LEFT.

Southwest Laboratory of Oklahoma

BY Robert Harris

TULSA BRANCH 10926 E. 55th Pl. Tulsa, Okla, 74146

OUR LETTERS AND REPORTS APPLY ONLY TO THE BANFLE TESTED AND ARE NOT NECESSARILY NOCATIVE OF THE QUALITIES OF APPARENTLY IDENTICAL OR SANLAR PRODUCTS.

CUSHING BRANCH P.O. Box 368 Cushing, Okla. 74023 (918) 225-1064

PHONE: 1-816-833-1919 1-816-833-1920

RADIUM PETROLEUM COMPANY



July 1, 1986

Mr. Joe Davis Missouri Department of Natural Resources Waste Management Program P.O. Box 176 Jefferson City, Missouri 65102

RE: Oil Contaminated Gravel at Radium Petroleum, Kansas City, Missouri Special Waste Authorization (Johnson County Pollution Control)

Dear Mr. Davis:

Radium Petroleum is currently seeking authorization to dispose of approximately 90 cubic yards of oil contaminated gravel at our Kansas City facility into the Johnson County Landfill in Shawnee, Kansas. Enclosed, please find sample results for the referenced waste stream. You will notice lab reports 6-5-0019, 6-5-0020, 6-5-0021 show that the waste is characteristically non-hazardous by definition and no PCB's were detected. Lab report 6-6-0050 as requested by your department shows 5.1% oil and grease (by weight) and a non-detectable level of PCB's which should qualify it as a non-hazardous waste in Missouri. In addition, the Director of Johnson County Pollution Control (Mr. Randy Bradley), who authorizes disposal at the landfill requested that PCB testing be performed by an EPA contract laboratory prior to final authorization. Enclosed are results showing PCB's are less than 50 parts per billion (<0.05 ppm).

Mr. Bradley is requesting a letter from MDNR certifying the waste to be non-hazardous. Please review the data for your determination and contact Mr. Bradley concerning this matter. Your prompt attention to this matter is greatly appreciated. If you have any questions, please do not hesitate to call me at 913-631-3300.

Sincerely.

Robert V. Vantuyl

Environmental Engineer

RVV:jd Enclosures

cc: Mr. Ronald D. Deffenbaugh

Mr. C. Wayne Case

Mr. Randy Bradley - Johnson County Pollution Control Department

P.O. Box 39

Mission, Kansas 66201



EDERICK A. BRUNNER

Director



STATE OF MISSOURI DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176

Jefferson City, MO 65102 314-751-3241 Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks and
Historic Preservation

August 15, 1986

Mr. Robert V. Vantuyl Radium Petroleum 1633 South Marsh Box 6206 Kansas City, MD 64126

Dear Mr. Vantuyl:

This letter is in response to your correspondence of July 1, 1986 concerning the ninety cubic yards (90 cu. yds.) of oil contaminated gravel at the Kansas City facility.

Based on the lab reports submitted to this office, the material is not a hazardous waste as defined in 10 CSR 25-4.010 or 10 CSR 25-11.010 of the Missouri Hazardous Waste Management Regulations.

If there are any questions concerning this matter, please feel free to contact this office.

Sincerely.

DIVISION OF ENVIRONMENTAL QUALITY

Kenneth J. Davis

Chief, Data Management Unit Waste Management Program

KJD:sls

cc: Mr. Randy Bradley, Johnson County Pollution Control

RECEIVED

AUG 1 8 1986

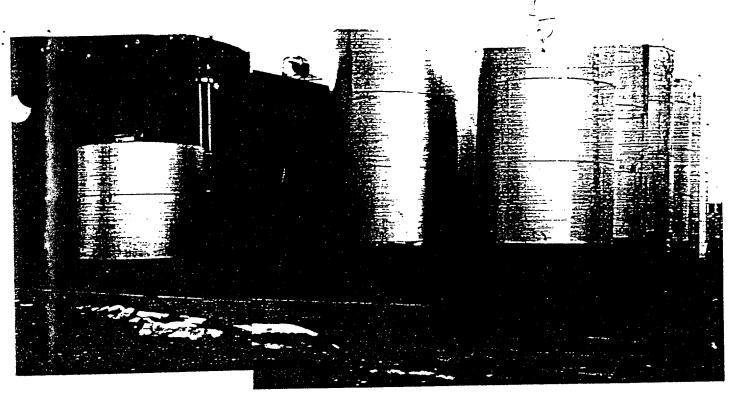
ENVIRONMENTAL DIV.

ATTACHMENT II

PHOTOGRAPHS

DECEMBER 22, 1987

RADIUM'S TANK FARM



Looking west. Upgraded tank farm area.



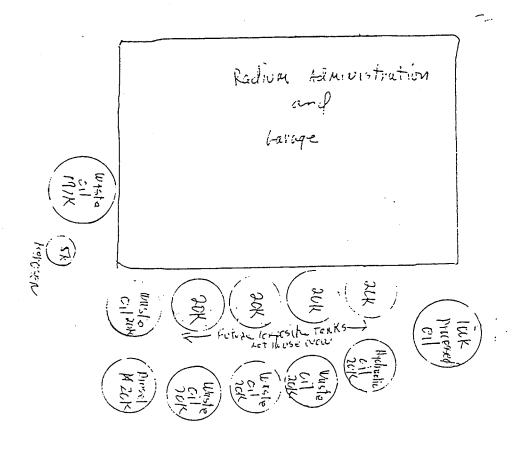
2. Looking west. Middle area described in memo. Upper right corner of photograph is three incoming waste oil storage tanks, two cooker tanks and filter.

ATTACHMENT III

ROUGH SKETCH OF TANK FARM.

DECEMBER 22, 1987

- turning of



ARPA under Exchuation

Tank Have Been
Removed and

are being stored east
of the facility

COMPOSITE TANK

--- REMOTIECH Tarks

MISSOURI DEPARTMENT OF NATURAL RESOURCES

NOTICE OF VIOLATION PÜRSUANT TO RÉQUIREMENTS OF THE MISSOURI HAZARDOUS WASTE MANAGEMENT LAW, RULES AND REGULATIONS 1.427

					•
adium Petroleum Co	Inc.				
ADDRESS	ICITY)			STATE	ZIP CODE
1633 South Marsh	KAUSAS	A : 4		MO	64126
WISSOURI ID NUMBER	- CADSAS	DATE OF WAPECTION	THIVESTICA	, –	57.20
		12/22/		17700	
01813					
During an inspection and/or a review of it	nformation or doc	umentation completed	this date to d	letermine co	impliance with the
requirements of the Missouri Hazardous Was					
10 CSR 25 the following violations were ide	ntified. The 40/49	CFR regulations cited	below have be	en adopted l	by reference in the
Missouri Hazardous Waste Regulations.					
CITATION		DESCRIPTI	ON OF VIOLATIC	N	
		A .	A	f A	
40 CFR 265. 112	COMMENC	ing Closur	= Activ	1+2 (1)	ithout
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	Suhn	: Hilla Am	エイン E 	PLAN E) R
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	Noti	fication)	_		
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	1				V-
		- af manaamaliaass at t	ha aarliaat nace	rible time. Th	nie notice does not
This information is provided to call your atter	ntion to those areas	or noncompliance at t	ne earnest pos	sible time. It	detions which may
constitute a compliance order issued pursuar	nt to Section 260.41	u, HSMo and may not b	e a complete iis	sting of all vic	nations which may
be identified as a result of this inspection.					
The owner/operator is hereby requested to	submit in writing v	vithin 15 days of receip	ot of this notice	a description	on of all corrective
actions taken and/or a schedule for complet					
Management Program, Department of Natura	al Resources, P.O.	Box 176, Jefferson City	, MO 65102 wi	th a copy to	the Administrator,
KANSAF City Regional Off	ice. 4609 A	Vorfloor, Isla	powers. V	10 646)55.
The corrective actions taken within 15 days o	f this notice will be	considered in determin	ing whether ent	forcement ac	tion, including the
assessment of civil penalties, should be initia	ted.	week at the same a			والمجسود المادي
			11	<u> </u>	
If you have any questions on this notice or wi	ish to discuss your	response, you may call	Mr. 10+	ملصه لر م	j &
at 314/751-2176 or Ms. JAN	Dra Carroll	at <u>5A m</u> E	·	- •	,
				1/ag/	' ~ ~
Signature of Preparer 11 mus M. (elio		Date	1/29/	00
	1 *		•	,	
The undersigned person hereby acknowledge	s that he/she recei	ved a copy of this Notic	e and has read	same.	
RE		PRINTED NAME	<u> </u>		:
		ROUALD	Deffent	ا میرود	
		1707410	~ (1 0 0	77	
ITLE .	:1	DATE			
President - Radium Petrol					
- STUDDE - IS ANTHON ICTAL	M M. TV	1			

APPENDIX A-8

SPECIAL WASTE DISPOSAL AUTHORIZATIONS



September 2, 1986

Radium Petroleum Company Attn: Mr. Robert Vantuyl Environmental Engineer 1633 South Marsh, Box 6206 Kansas City, Missouri 64126

Re: Johnson County Industrial Solid Waste Disposal Authorization Number 86-56

Dear Mr. Vantuyl:

We are in receipt of your letter of July 1, 1986, requesting to dispose of approximately 90 cubic yards of oil contaminated gravel. Information you supplied indicated the waste is non-hazardous.

Approval is given to dispose of this waste at the Johnson County Landfill, Inc., operating under Kansas Permit 263 provided the following conditions are met:

- 1. Approval to deliver the waste must be obtained from the landfill operator prior to transporting the waste to the landfill. The final decision on whether to accept or reject the waste rests with the landfill operator. Please call Mr. Robert Vantuyl, 913/631-3300 to obtain approval. If the landfill operator refuses to accept this waste you should contact us to determine alternative disposal options.
- 2. The waste must be transported separately to the landfill and be identified to the operator upon delivery.
- 3. Kansas Administrative Regulation 28-29-23(r) requires solid waste disposal facilities to maintain a log of commercial or industrial wastes received such as sludges, liquids, and barreled waste. The log must indicate the source and quantity of waste and the disposal location thereof. The industrial waste authorization number should be used as identification when entering the shipment into the log.
- 4. Bulk liquids or sludges must be adequately containerized to prevent leakage and/or spillage of waste on roads and highways during transportation.

Solid Waste Disposal Authorization #86-56 Page 2 September 2, 1986

5. This approval is valid for a one-time shipment only of this waste to the landfill. This authorization expires September 2, 1987. If the waste has not been taken to the landfill by this date, you must apply for a new authorization.

Sincerely,

Randy D. Bradlen

Randy D. Bradley

Director

RDB:mb/SDA48

cc: Charles H. Linn, P.E., Kansas Department of Health and Environment Ronald D. Deffenbaugh, Johnson County Landfill, Inc.

Douglas L. Smith, Director of Health Services





Division of Environmental Quality Division of Geology and Land Survey Division of Management Services Division of Parks and Historic Preservation

Division of Energy

STATE OF MISSOURI DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY

P.O. Box 176 Jefferson City, MO 65102 314-751-3241

August 15, 1986

Mr. Robert V. Vantuyl Radium Petroleum 1633 South Marsh Box 6206 Kansas City, MD 64126

Dear Mr. Vantuyl:

This letter is in response to your correspondence of July 1, 1986 concerning the ninety cubic yards (90 cu. yds.) of oil contaminated gravel at the Kansas City facility.

Based on the lab reports submitted to this office, the material is not a hazardous waste as defined in 10 CSR 25-4.010 or 10 CSR 25-11.010 of the Missouri Hazardous Waste Management Regulations.

If there are any questions concerning this matter, please feel free to contact this office.

Sincerely,

DIVISION OF ENVIRONMENTAL QUALITY

Kenneth J. Davis

Chief, Data Management Unit Waste Management Program

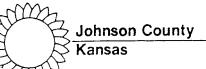
KJD:sls

cc: Mr. Randy Bradley, Johnson County Pollution Control

RECEIVED

AUG 1 8 1986

ENVIRONMENTAL DIV.



April 30, 1987



Radium Petroleum Company Attn: Mr. Romald D. Deffenbaugh, President 1633 South Marsh, Box 6206 Kansas City, Missouri 64126

Re: Johnson County Industrial Solid Waste Disposal Authorization Number 87-92

Dear Mr. Deffenbaugh:

We are in receipt of your letter of April 16, 1987, requesting to dispose of approximately 250 cubic yards of oil contaminated gravel. Information you supplied indicated the waste is **non-hazardous**.

Approval is given to dispose of this waste at the Johnson County Landfill, Inc., operating under Kansas Permit 263 provided the following conditions are met:

- 1. Approval to deliver the waste must be obtained from the landfill operator prior to transporting the waste to the landfill. The final decision on whether to accept or reject the waste rests with the landfill operator. Please call Mr. Robert Vantuyl, 913/631-3300 to obtain approval. If the landfill operator refuses to accept this waste you should contact us to determine alternative disposal options.
- 2. The waste must be transported separately to the landfill and be identified to the operator upon delivery.
- 3. Kansas Administrative Regulation 28-29-23(r) requires solid waste disposal facilities to maintain a log of commercial or industrial wastes received such as sludges, liquids, and barreled waste. The log must indicate the source and quantity of waste and the disposal location thereof. The industrial waste authorization number should be used as identification when entering the shipment into the log.
- 4. Bulk liquids or sludges must be adequately containerized to prevent leakage and/or spillage of waste on roads and highways during transportation.

Solid Waste Disposal Authorization #87-92 Page 2 April 30, 1987

5. This approval is **valid** for a **one-time shipment only** of this waste to the landfill. This authorization expires **April 30, 1988.** If the waste has not been taken to the landfill by this date, you must apply for a new authorization.

Sincerely,

Randy D. Bradley

Randy D. Bradley

Director

RDB:mb/SWA92

cc: Charles H. Linn, Chief, Solid Waste Section, KDHE Robert Vantuyl, Johnson County Landfill, Inc. Douglas L. Smith, Director of Health Services

PHONE: 1-816-833-1919 1-816-833-1920

RADIUM PETROLEUM COMPANY



April 16, 1987

Mr. Randy Bradley Johnson County Pollution Control Department P.O. Box 39 Mission, Kansas 66201

Dear Mr. Bradley:

Enclosed please find a disposal authorization request form and lab testing by a KDHE certified lab for disposal of an additional 250 yards of contaminated soil generated at Radium Petroleum Company, Kansas City, Missouri. This is in addition to the 90 yards previously approved by your department under authorization 86-56. Extensive site modifications and improvements at the Radium facility necessitate the need for this additional disposal request.

If you have any additional testing or have any questions, please do not hesitate to call me at 913-631-3300.

Sincerely,

Robert V. Vantuyl

Environmental Engineer

RVV:jd Enclosure

cc: Ronald D. Deffenbaugh

C. Wayne Case

JOHNSON COUNTY POLLUTION CONTROL DEPARTMENT

SPECIAL WASTE DISPOSAL REQUEST FORM

I.	. Ge	eneral Information:
	Co	ompany Name: RADIUM PETROLEUM Co.
	Ad	idress: 1633 S. MARSH AVE.
	Ci	ty, State, Zip KANSAS CITY, Mo. 64126
	Co	intact, Title, Telephone 1: - ROBERT V. VANTUYL ENV. ENG.
		913-631-3300
II.	Wa	ste Characterization:
	A.	Name of waste: Dil contaminated gravel
	В.	Description of waste generation process: pil contaminated
		gravel within the tank form area
Ò	c.	Physical State: (Check one) 1. Solid × 2. Slurry 3. Liquid 4. Sludge 5. Other-specify
		Waste physical properties: pH solids by weight Flash point >195 Using Pensky-Martins Closed Cup (4STM D-93-77) or Setaflash Closed Tester (ASTM Standard D-3278-73) Specific gravity -1/4 Odor description oic, NYOROCAREON'S Free fluid: Yes No x
	D.	Was the waste ever classified or listed as hazardous? If Yes, the previous waste I.D. number was
	E.	Chemical Composition (attach any additional analysis with description of sampling and analytical methods, and all applicable Material Safety Data Sheets). Lab analysis cannot be older than one (1) year to be used here.
		Major Components wt. \$ wt. \$ 1. <u>SEE ATTACHED REPORTS(3)</u> 3. 2. 4. 5. 6.
	F.	Source of Chemical Data: Quality ANALYTICAL SERVICES, /~C.
II.	Gen	eration Rate:
	Λ. Β. C.	te Generation is: (Check one) Continual Average generation rate per month include units Intermittent X Rate VARIABLE include units, REQUEST AUTHORIZATION, One time only Quantity include units If A or B, indicate amount for immediate disposal

Transportation: Container used for transportation (Check one) 1. _____ Bulk (_20 cubic yds.) 2. _____ metal drum (____ gal) cases, cartons (size, number/case fiber drums (gal) Other-specify B. Will the container used in transport be landfilled with the waste? If No, specify No, BULK TRANSPORT, ROLLOFF CONTAINER V. Certification: I, the undersigned, submit this request to dispose of the named waste and certify that the waste named herein to the best of my knowledge is not a hazardous waste as defined by the state(s) in which it is generated, transported, and/or stored, including the Kansas Hazardous Waste Management Regulations, and that the information supplied by me is correct. I also understand that if a disposal authorization is issued it will be valid for one (1) year from the date of issue. ROUALD D. DEFFENBAUGH PRESIDENT Print Name Title Additional Comments:

The waste generator must sign this request or it cannot be considered..

nalytical Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Petroleum

1633 S. Marsh

Kansas City, MO 64126 DATE: 4/9/87

METHOD

REPORT #: 7040914

DETECTION

CONC.

attn : Bob Vantuyl

QAS SAMPLE #: 70314001 DATE RECEIVED: 3/31/87

PARAMETER

SAMPLE ID: Soil samples taken from around tanks and

septic tanks. 0 - 6" deep

. There is a resistance to the latter sense and residence and the sense than the sense and the sense	T TAIN SIN AND THE TOTAL SIN THE SAME SIN THE	LIMIT	
Flash Point	ASTM D-93	NA	> 195 F
FCBS	8080	0.2 mg/kg	ND ND
Oil & Grease	503.C	. 0.1 %	1.1 %
EF TOX	1310		
Arsenic	7060	0.005 mg/l	ND :
Barium	7080	1 mg/l	4 mg/l
Cadmium	7130	0.01 mg/l	ND
Chromium	7190	0.05 mg/l	ND
Lead	7420	0.5 mg/l	ND
Mercury	7470	0.0005 mg/l	ND
Selenium	7740	0.005 mg/l	· ND
Silver	7760	0.01 mg/l	0.04 mg/l

Quality Analytical Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Petroleum

1633 S. Marsh

Kansas City, MO 64126

REPORT #: 7040913

CONC.

DATE: 4/9/87

DETECTION

attn : Bob Vantuyl

@AS SAMPLE #: 70316002

DATE RECEIVED: 3/31/87

PARAMETER

SAMPLE ID: Soil samples taken from around tanks and

septic tanks. 12 - 18" deep

METHOD

		LIMIT	
Flash Point	ASTM D-93	NA	> 195 F
PCBS	8080	0.2 mg/kg	ND
Oil & Grease	503.C	0.1 %	4.5 %
EP TOX Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	1310 7060 7080 7130 7190 7420 7470 7740 7760	0.005 mg/l 1 mg/l 0.01 mg/l 0.05 mg/l 0.5 mg/l 0.0005 mg/l 0.005 mg/l	ND 2 mg/1 ND

Jella III

Analytical Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Petroleum

1633 S. Marsh

Kansas City, MO 64126 DATE: 4/9/87

REPORT #: 7040914

attn : Bob Vantuyl

DAS SAMPLE #: 70316003 DATE RECEIVED: 3/31/87

, . SAMPLE ID: Soil samples taken from around tanks and

septic tanks. 30 - 36" deep

 PARAMETER	METHOD	DETECTION LIMIT	CDNC.
 			التحار طالب بالبد ولقية هنجا وسان نجب باسان است محمه وحاط دوب بد
Flash Point	ASTM D-93	NA ·	> 195 F
FCBS	8080	0.2 mg/kg	ND
Oil & Grease	503.8	0.1 %	1.1 %
EP TOX	1310		
Arsenic	7060	0.005 mg/l	ND
Barium	7080	1 mg/l	2 mg/l
Cadmium	7130	0.01 mg/l	ND
Chromium	7190	0.05 mg/l	ND
Lead	7420	0.5 mg/l	ND
Mercury	7470	0.0005 mg/l	. ND
Selenium	7740	0.005 mg/l	ND
Silver	7760	0.01 mg/l	0.04 mg/l

APPENDIX A-9 SOIL ANALYTICAL RESULTS

APPENDIX A-9.1

Analytical Results

of

Soil Samples (Septic Tank)

March, 1987

Analytical Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Petroleum

1633 S. Marsh

Kansas City, MO 64126 DATE: 4/9/87

REPORT #: 7040914

attn : Bob Vantuyl

QAS SAMPLE #: 70316001 DATE RECEIVED: 3/31/87

GAMPLE ID: Soil samples taken from around tanks and

septic tanks. 0 - 6" deep

,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,	LIMIT	55.151
Flash Point	ASTM D-93	NA	> 195 F
PCBS	8080	0.2 mg/kg	ND
Cil & Grease	503.0	0.1 %	1.1 %
EF TOX Arsenic	1310 7060	0.005 mg/l	ND
Barium	7080	1 mg/l	4 mg/l
Cadmium	7130	0.01 mg/l	מס _
Chromium	7190	0.05 mg/l	ND
Lead	7420	0.5 mg/l	ND
Mercury	7470	0.0005 mg/l	ND
Selenium	7740	0.005 mg/l	· ND
Silver	7760	0.01 mg/l	0.04 mg/l

Quality Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Petroleum

1633 S. Marsh

Kansas City, MO 64126

REPORT #: 7040913

DATE: 4/9/87

attn - : Bob Vantuyl

QAS SAMPLE #: 70316002 DAYE RECEIVED: 3/31/87

SAMPLE ID: Soil samples taken from around tanks and

septic tanks. 12 - 18" deep

FARAMETER	METHOD	DETECTION LIMIT	CONC.
Flash Peint	ASTM D-93	NA	> 195 F
PCBS	8080	O.2 mg/kg	ND
Oil & Grease	503.C	0.1 %	4.5 %
EF TOX	1310		
Arsenic	7060	0.005 mg/l	ND
Barium	7080	1 mg/l	2 mg/l
Cadmium	7130	0.01 mg/l	ND
Chromium	7190	0.05 mg/1	ИD
Lead	7420	0.5 mg/l	ND
Mercury	7470	0.0005 mg/l	. ND
Selenium	7740	0.005 mg/l	ND
Silver	7760	0.01 mg/l	0.04 mg/l

_///__//

Analytical Services, Inc.

1633 S. Marsh • Box 266517 • Kansas City, MO 64126 • (816) 254-5257

ADDRESS: Radium Fetroleum

1633 S. Marsh

Kansas City, MO 64126 DATE: 4/9/87

REPORT #: 7040914

attn : Bob Vantuyl

QAS SAMPLE #: 70316003 DATE RECEIVED: 3/31/87

SAMPLE ID: Scil samples taken from around tanks and

septic tanks. 30 - 36" deep

PARAMETER	METHOD	DETECTION LIMIT	CONC.
			د جود هند هند هند هند به مند مند مند المدر ا ا
Flash Point	ASTM D-93	NA	> 195 F
FCBS	S080	0.2 mg/kg	מא
Cil & Grease	<u> ಕಂತುರ</u>	0.1 %	1.1 %
EF TOX	1310		
Arsenic	7040	0.005 თვ/1	ND
Barium	7080	1 mg/l	2 mg/l
Cadmium	7130	0.01 mg/l	DIA
Chromium	7190	0.05 mg/l	ND
Lead	7420	0.5 mg/l	ND
Mercury	7470	0.0005 mg/l	. ND
Selenium	7740	0.005 mg/l	ИД
Silver	7760	0.01 mg/l	0.04 mg/l

APPENDIX A-9.2

Analytical Results

of

Soil Samples (Livers Bronze)

January, 1988

Quality Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012702

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231002 DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, UPPER SOIL.

ANALYTICAL RESULTS

FARAMETER	METHOD	DET. LIMIT	CONC.
PERCENT MOISTURE	EPA-SOW-787 D-84	0.10 %	: 25.7 %
HALOGENS		20 mg/Kg	: 76 mg/Kg
METALS — TOTAL	3050		
ARSENIC	6010	0.37 mg/Kg	: 9.94 mg/Kg
BARIUM	6010	3'mg/Kg	: 192 mg/Kg
CADMIUM	6010	0.2 mg/Kg	: 0.3 mg/Kg
CALCIUM	6010	<i>77</i> mg/Kg	: 3616 mg/Kg
CHROMIUM	6010	0.7 mg/Kg	: 11.4 mg/Kg
IRON	6010	6.4 mg/Kg	: 18350 mg/Kg
LEAD	6010	5.6 mg/Kg	: ND
MERCURY	245.1	: 120 mg/Kg	: ND
SELENIUM	6010	0.40 mg/Kg	: ND
SILVER	6010	2 mg/Kg	: ND

NA = NOT APPLICABLE ND = NOT DETECTED

Quality Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 94126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012709

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231002 DATE RECEIVED: 12/31/87

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, UPPER SOIL.

ANALYTICAL RESULTS

FARAMETER	METHOD	DET. LIMIT	CONC
	T and the said that the right the right the said the said the right the said the sai		
PCBS	USEPACLP, EXHIBIT D		
AROCLOR-1016		80.0 ug/L	: ND
AROCLOR-1221		80.0 ug/L	: ND
AROCLOR-1232		80.0 ug/L	: ND
AROCLOR-1242		80.0 ug/L	: ND
AROCLOR-1248		80.0 ug/L	: ND
AROCLOR-1254		160.0 ug/L	g ND
AROCLOR-1260		160.0 ug/L	: MD

NA = NOT APPLICABLE ND = NOT DETECTED

Quality Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012715

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231002

DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLED BY: KELLY, LOU, DWIGHT

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, DATE ANALYZED: 01/07/88

UPPER SOIL.

PARAMETER	DET. LIMIT		CONC.
VOLATILES (METHOD 8240)	a dia diri, and this fire are and and and and the star are are are are are and the		
CHLOROMETHANE	100 ug/Kg	:	ND
BROMOMETHANE	100 ug/Kg	:	ND
VINYL CHLORIDE	100 ug/Ko	:	ND
CLOROETHANE	100 ug/Kg	*	ND
METHYLENE CHLORIDE	50 ug/Kg		654 rug/Kg
ACETONE	100 ūg/kg		ND'
CARBON DISULFIDE	50 ug/Kg		ND
1,1-DICHLOROETHENE	50 ug/Kg		ФИ
1,1-DICHLOROETHANE	50 ug/Kg		ND
1,2-DICHLOROETHENE	50 ug /Kg	2	ND
CHLOROFORM	50 ug/Kg	:	ND
1,2-DICHLOROETHANE	50 ug/Kg	2	ПD
2-BUTANONE	100 ug/Kg	n A	ND
1,1,1-TRICHLOROETHANE	50 ug/Kg	ä	ND
CARBON TETRACHLORIDE	50 ug/Kg	u **	ND

= NOT DETECTED
= NOT APPLICABLE

Analytical Services, Inc.

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SERVICE TO: DEFFENBAUGH IND. REPORT # 8012715
PAGE 2

:	DATE: 38/01/27		
PARAMETER	DET. LIMIT	4°° - 1973 1974 - 1974 1974 1974 1974 1974 1974 1974 1974	CONC.
VINYL ACETATE	100 ug/≥ig	:	ND
EROMODICHLOROMETHANE	5 0 ug/Kg	#	ND
1,2-DICHLOROPROPANE	50 u g/ko	# Pr	ND
CIS-1,3-DICHLOROPROPENE	50 ug 7%g	:	ND
TRICHLOROETHANE	50 ugzka		ND
DIBROMOCHLOROMETHANE	50 ug/Kg	n	ND
1,1,2-TRICHLOROETHANE	50 ug/Kg	11 11	ND
BENZENE	50 ug/Kg	s U	ND
TRANS-1,3-DICHLOROPROPENE	50 ug/Kg		ND
BROMOFORM	50 ug/Kg		ND
4-METHYL-2-PENTANONE	100 üg/fig		ND
2-HEXANONE	100 ug/kg		ND
TETRACHLOROETHENE	50 ug/Ka		ND
1,1,2,2-TETRACHLOROETHANE	50 ug/kg	¥	ND
TOLUENE	50 uğ/Kğ	#	297 ug/Kg
CHLOROBENZENE	50 ug/Kg	t.	ND
ETHYLBENZENE	50 ug/Kg	21 61	MD
STYRENE	50 ug/Kg	R H	MD
TOTAL XYLENES	50 ug/Kg	#	232 ug/Kg

ND = NOT DETECTED NA = NOT APPLICABLE



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: TEST

REPORT #: 8022306

DATE: 88/02/23

ATTN: DWIGHT BRINKLEY

MSL 777.76'

QAS SAMPLE #: 71231002

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS TEST HOLE #2,

UPPER SOIL. 24.5

DATE RECEIVED: 12/31/87 SAMPLED BY: KELLY GIFSON

> DWIGHT BRINKLEY LOU CUNNINGHAM -

DET. LIMIT CONC.

: PERCENT MOISTURE

: EPA-SOW-787,D84: 0.10 % : 25.7 % : 503 A : 10 mg/Kg : 3627 mg/Kg

: DIL AND GREASE

: 503 A

ND = NOT DETECTED NA = NOT APPLICABLE

RECEIVED.

FEB 2 5 1000

BUREAUS L.,

Quality Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012703

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231003 DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, LOWER SOIL.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC.
PERCENT MOISTURE	EFA-SOW-787 D-84	0.10 %	: 23.5 %
HALOGENS		20 mg/Kg	: 38 mg/Kg
METALS - TOTAL	3050		
ARSENIC	6010	0.37 mg/Kg	: 10.1 mg/Kg
BARIUM	5010	8 mg/Kg	: 147 mg/Kg
CADMIUM	6010	0.2 mg/Kg	: 0.4 mg/Kg
CALCIUM	6010	77 mg/Kg	: 2919 mg/Kg
CHROMIUM	6010	0.7 mg/Kg	: 7.8 mg/Kg
IRON	6010	6.4 mg/Kg	: 14660 mg/Kg
LEAD	6010	5.6 mg/Kg	: ND
MERCURY	245.1	: 100 mg/Kg	: ND
SELENIUM	6010	0.40 mg/Kg	: ND
SILVER	6010	2 mg/Kg	a MD

NA = NOT APPLICABLE ND = NOT DETECTED

nalytical Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012710

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #2 71231003 DATE RECEIVED: 12/31/87

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, LOWER SOIL.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC	
	and the last two two cases and the cases are two cases and the cases are cases and the cases and the cases are cases are cases are cases and the cases are cases a		MA (ALL) - 200 CON 200 AND (ALL), 1,22 (ALL), 124 MIN AND INC	
PCBS	USEPACLP, EXHIBIT D			
AROCLOR-1016		80.0 ug/L	: ND	
AROCLOR-1221		80.0 ug/L	# ND	
AROCLOR-1232		80.0 ug/L	: ND	
AROCLOR-1242		80.0 ug/L	: ND	
AROCLOR-1248		80.0 ug/L	: ND	
AROCLOR-1254		160.0 ug/L	: ND	
AROCLOR-1260		160.0 ug/L	: ND	

NA = NOT APPLICABLE ND = NOT DETECTED



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPDRT #: 8012716

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231003

DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLED BY: KELLY, LOU, DWIGHT

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, DATE ANALYZED: 01/10/88

LOWER SOIL.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)		
CHLOROMETHANE	100 ug/Kg	
BROMOMETHANE	100 ug/Kg	: ND
VINYL CHLORIDE	100 ug/Kg	: NI)
CLOROETHANE	100 ug/Kg	# ND
METHYLENE CHLORIDE	50 ug/Kg	
ACETONE	100 ug/Kg	: ND
CARBON DISULFIDE	50 ug/Kg	
1,1-DICHLOROETHENE	50 ug/Kg	
1,1-DICHLOROETHANE	50 ug/Kg	: ND
1,2-DICHLOROETHENE	50 ug/Kg	: ND
CHLOROFORM	50 ug/Kg	: ND
1,2-DICHLOROETHANE	50 ug/Kg	
2-BUTANONE	100 ūg/kg	
1,1,1-TRICHLORGETHANE	50 ugŽKa [©]	
CARBON TETRACHLEFIDE	50 ug/Kg	

= NOT DETECTED = NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH (ND).

REPORT #: 8012716
FAGE 2
DATE: 88/01/27

PARAMETER

DET. LIMIT CONC.

VINYL ACETATE	100 ug/Kg	=	ND
BROMODICHLOROMETHANE	50 ug/Kg -		ND
1,2-DICHLOROPROPANE	50 ug/Kg	:	ND
CIS-1,3-DICHLOROFROPEDE	50 ug/Kg	;	ND
TRICHLOROETHANE	50 ug/Kg	ä	ND
DIBROMOCHLOROMETHANE	50 ug/Kg	*	ND
1,1,2-TRICHLOROETHANE	50 ug/Kg	ts. 12	ND
BENZENE	50 ug/Kg	:	ND
TRANS-1,3-DICHLOROPROPENE	50 ug/Kg		ND
BROMOFORM	50 ug/Kg		ND
4-METHYL-2-PENTANONE	100 ug/Kg	=	ND
2-HEXANONE	100 ug/kg	:	ND
TETRACHLOROETHENE	50 ug/Kg	*	ND
1,1,2,2-TETRACHLOROETHANE	50 ug/Kg	:	ND
TOLUENE	50 ug/Kg		861 ug/Kg
CHLOROBENZENE	: 50 ug/Kg	4	ND
ETHYLBENZENE	50 ug/Kg		ND
STYRENE	50 ug/Kg	ü	ND .
TOTAL XYLENES	50 ug/Kg	2	278 ug/Kg

ND = NOT DETECTED NA = NOT APPLICABLE



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: TEST

REPORT #: 8022307

DATE: 88/02/23

ATTN: DWIGHT BRINKLEY

Duß

DAS SAMPLE #: 71231003

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS TEST HOLE #2,

LOWER SOIL. 27

DATE RECEIVED: 12/31/87
SAMPLED BY: KELLY GIPSON
DWIGHT BRINKLEY
LOU CUNNINGHAM

PARAMETER	METHOD	DET. LIMIT	CONC.
: PERCENT MOISTURE	: EFA-SOW-787,	DS4: 0.10 %	: 23.5 %
: OIL AND GREASE	: 503 A	: 10 mg/Kg	: 1087 mg/Kg

ND = NOT DETECTED NA = NOT APPLICABLE

RUSSELL D. MOODY

FEB 26 1988

Quality Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012705

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231005 DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS, TEST HOLE #3, UPPER SOIL.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC.
PERCENT MOISTURE	EPA-SOW-787 D-84	0.10 %	: 26.4 %
HALOGENS	MICROCOULEMETRIC	20 mg/Kg	: 62 mg/Kg
METALS - TOTAL	3050		
ARSENIC	6010	0.37 mg/Kg	: 4.95 mg/Kg
BARIUM	6010	0 mg/Kg	: 112 mg/Kg
CADMIUM	6010	0.2 mg/Kg	: ND
CALCIUM	6010	77 mg/Kg	: 3094 mg/Kg
CHROMIUM	6010	0,7 mg/Kg	: 9.4 mg/Kg
IRON	6010	6.4 mg/Kg	: 11310 mg/Kg
L'EAD	6010	5.6 mg/Kg	: 7.3 mg/Kg
MERCURY	245.1	140 mg/Kg	: ND
SELENIUM	6010	0.40 mg/Kg	: ND
SILVER	6010	2 my/Kg	: ND

NA = NOT APPLICABLE ND = NOT DETECTED

Russell D. Moody

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012711

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

GAS SAMPLE #: 71231005 OATE RECEIVED: 12/31/87

MAMPLE INFORMATION: LIVERS, TEST HOLE #3, UPPER SOIL.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC
			No. 1140 May 2017 D 77 Print 2018 May 1140 May
PCBS	USEPACLP, EXHIBIT D		
AROCLOR-1016 AROCLOR-1221 AROCLOR-1232 AROCLOR-1242 AROCLOR-1248 AROCLOR-1254 AROCLOR-1254		80.0 ug/L 80.0 ug/L 80.0 ug/L 80.0 ug/L 80.0 ug/L 160.0 ug/L	: ND : ND : ND : ND : ND : ND

NA = NOT APPLICABLE ND = NOT DETECTED

Russell D. Moody

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 9012717

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231005

DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLED BY: KELLY, LOU, DWIGHT

SAMPLE INFORMATION: LIVERS, TEST HOLE #3, DATE ANALYZED: 01/12/88

UPPER SOIL.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	para hand stade state, quies man ambit which what your state state state again about state state again.	adder aller saller beite state spire se'ts daller egge mede diens sätte diller right, state
CHLOROMETHANE	100 ug/Kg	# ND
BROMOMETHANE	100 ug/Kg	: ND
VINYL CHLORIDE	100 ug/Kg	: ND
CLOROETHANE	100 ug/Kg	: ND
METHYLENE CHLORIDE	50 ug/Kg	: ND
ACETONE	100 ug/Kg	: ND
CARBON DISULFIDE	50 ug/Kg	: ND
1,1-DICHLOROETHENE	50 ug/Kg	: ND
1,1-DICHLOROETHANE	50 ug/Kg	
1,2-DICHLOROETHENE	50 ug/Kg	
CHLOROFORM	50 ug/Kg	: 75 ug/Kg
1,2-DICHLOROETHANE	50 ug/Ka	s ND
2-BUTANONE	100 ūg/kg	: ND
1,1,1-TRICHLOROETHANE	50 ug/kg	
CARBON TETRACHLORIDE	50 ug/kg	ı NI)

= NOT DETECTED = NOT APPLICABLE Hussell D. Moody

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SERVICE TO: DEFFENBAUGH IND. :	REPORT #: 80 PA DATE: 88/01/	3E 2
PARAMETER	DET. LIMIT	CONC.
VINYL ACETATE	100 ug/Kg	
BROMODICHLOROMETHANE 1,2-DICHLOROPROPANE	50 ug/Kg 50 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE TRICHLOROETHANE DIBROMOCHLOROMETHANE	50 ug/Kg 50 ug/Kg 50 ug/Kg	: ND
1,1,2-TRICHLOROETHANE BENZENE	50 ug/Kg 50 ug/Kg	: ND
TRANS-1,3-DICHLOROPROPENE BROMOFORM	50 ug/Kg 50 ug/Kg	: ND
4-METHYL-2-PENTANONE 2-HEXANONE	100 ug/Kg 100 ug/kg	: ND
TETRACHLOROETHENE 1,1,2,2-TETRACHLOROETHANE TOLUENE	50 ug/Kg 50 ug/Kg 50 ug/Kg \	a ND

ND = NOT DETECTED NA = NOT APPLICABLE

CHLOROBENZENE

TOTAL XYLENES

ETHYLBENZENE

STYRENE

Nusell D. Moody

50 ug/Kg

50 ug/Kg

50 ug/Kg

50 ug/Kg

: MD

s ND

: 2670 ug/Kg

: 17396 ug/Kg

Lewight



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: TEST

REPORT #: 8022308

DATE: 88/02/23

ATTŃ: DWIGHT BRINKLEY WB.

MSL 774.75

QAS SAMPLE #: 71231005

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS TEST HOLE #3,

UPPER SOIL.

DATE RECEIVED: 12/31/87

SAMPLED BY: KELLY GIPSON

DWIGHT BRINKLEY LOU CUNNINGHAM

DET. LIMIT METHOD

: PERCENT MOISTURE

: EPA-SOW-787, D84: 0.10 % : EPA-SDW-787,D84: 0.10 % : 26.4 % : 503 A : 10 mg/Kg : 7592 mg/Kg

: DIL AND GREASE

ND = NOT DETECTED NA = NOT APPLICABLE

RECEIVE

FEB 26 YANA

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012706

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231006 DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS, TEST HOLE #3, LOWER SOIL.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC.
PERCENT MOISTURE		0.10 %	: 24.6 %
HALOGENS	D-84 MICROCOULEMETRIC	20 mg/Kg	: 44 mg/Kg
METALS - TOTAL	3050		
ARSENIC	6010	0.37 mg/Kg	: 5.71 mg/Kg
BARIUM	6010	8 mg/Kg	: 190 mg/Kg
CADMIUM	6010	0.2 mg/Kg	: 1.131 mg/Kg
CALCIUM	6010	77 mg/Kg	: 2916 mg/Kg
CHROMIUM	6010	0.7 m g/Kg	: 9.5 mg/Kg
IRON	6010	6.4 mg/Kg	: 15350 mg/Kg
LËAD	6010	5.6 mg/Kg	: 6.6 mg/Kg
MERCURY	245.1	: 90 mg/Kg	: ND
SELENIUM	6010	0.40 mg/Kg	a ND
SILVER	6010	2 mg/Kg	: ND

NA = NOT APPLICABLE ND = NOT DETECTED

Russell D. Moody

Analytical Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012712

.

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231006 DATE RECEIVED: 12/31/87

SAMPLE INFORMATION: LIVERS, TEST HOLE #3, LOWER SOIL.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC
tions from these prices are the table of the lique tipps are more stort areas.			
PCBS ,	USEPACLP, EXHIBIT D		
AROCLOR-1016		80.0 ug/L	: ND
AROCLOR-1221		80.0 ug/L	: ND
AROCLOR-1232		80.0 ug/L	: ND
AROCLOR-1242		80.0 ug/L	: ND
AROCLOR-1248		80.0 ug/L	: ND
AROCLOR-1254		160.0 ug/L	: ND
AROCLOR-1260		160.0 ug/L	: ND

NA = NOT APPLICABLE ND = NOT DETECTED

Aussell D. Moody

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012718

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231006

DATE RECEIVED: 12/31/87

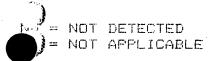
DATE SAMPLED:

SAMPLED BY: KELLY, LOU, DWIGHT

SAMPLE INFORMATION: LIVERS, TEST HOLE #3, DATE ANALYZED: 01/12/88

LOWER SOIL.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)		
CHLOROMETHANE BROMOMETHANE VINYL CHLORIDE CLOROETHANE METHYLENE CHLORIDE ACETONE CARBON DISULFIDE 1,1-DICHLOROETHENE 1,1-DICHLOROETHANE 1,2-DICHLOROETHENE CHLOROFORM 1,2-DICHLOROETHANE 2-BUTANONE 1,1,1-TRICHLOROETHANE	100 ug/Kg 100 ug/Kg 100 ug/Kg 100 ug/Kg 50 ug/Kg 50 ug/Kg 50 ug/Kg 50 ug/Kg 50 ug/Kg 50 ug/Kg 50 ug/Kg 100 ug/Kg	: ND : ND : ND : ND : ND : ND : ND : ND
CARBON TETRACHLORIDE	50 ug/Kg	: ND



Aussell D. Moody

Quality Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012718

PAGE 2

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:	DATE: 88/01/	27
PARAMETER	DET. LIMIT	CONC.
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VINYL ACETATE	100 ug/Kg	: ND
BROMODICHLOROMETHANE	50 ug/Kg	: ND
1,2-DICHLOROPROPANE	50 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE	50 ug/Kg	
TRICHLOROETHANE	50 ug/Kg	: ND
DIBROMOCHLOROMETHANE	50 ug/Kg	: ND
1,1,2-TRICHLOROETHANE	50 ug/Kg	: ND
BENZENE	50 ug/Kg	: ND
TRANS-1,3-DICHLOROPROPENE	50 ug/Kg	: ND
BROMOFORM	50 ug/Kg	: ND
4-METHYL-2-PENTANONE	100 ug/Kg	: ND
2-HEXANONE	100 ug/kg	: ND
TETRACHLOROETHENE	50 ug/Kg	: ND
1,1,2,2-TETRACHLOROETHANE	50 ug/Kg	: ND
TOLUENE	50 ug/Kg	: 764 ug/Kg
CHLOROBENZENE	50 ug/Kg	# ND
ETHYLBENZENE	50 ug/Kg	: 208 ug/Kg
STYRENE	50 ug/Kg	
TOTAL XYLENES	50 ug/Kg	: 1373 ug/Kg

ND = NOT DETECTED NA = NOT APPLICABLE



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: TEST

REPORT #: 8022309

DATE: 88/02/23

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231006

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS TEST HOLE #3,

LOWER SOIL.

26

DATE RECEIVED: 12/31/87

SAMPLED BY: KELLY GIPSON

DWIGHT BRINKLEY

LOU CUNNINGHAM

PARAMETER	METHOD	DET. LIMIT	CONC.
: PERCENT MOISTURE	: EPA-SOW-787,D	84: 0.10 %	: 24.6 %
: OIL AND GREASE	: 503 A	: 10 mg/Kg	: 67 mg/Kg

ND = NOT DETECTED NA = NOT APPLICABLE

RUSSELL D. MOODY

RECEIVED FEB 26 1988

Paris to

APPENDIX A-9.3

Analytical Results

of

Soil Samples (Tank Farm)

April, 1988



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80621001

-

DATE: 6-21-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419002

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 1, 3-14", SOIL SAMPLE

EXTRACTION / ANALYSIS METHODS	DET. LIMIT mg/Kg	CBNC. mg/Kg
CLP-M EXHIBIT D/204.2	0.4	: ND
CLP-M EXHIBIT D/206.2	0.4	: 13.2/
CLP-M EXHIBIT D/200.7	8.0	: 226 /
CLP-M EXHIBIT D/200.7	0.3	: ND
CLP-M EXHIBIT D/200.7	0.2	: 4.3
CLP-M EXHIBIT D/200.7	1.0	: 17.5
CLP-M EXHIBIT D/239.2	0.3	: 438
CLP-M EXHIBIT D/245.5	0.2	: ND
CLP-M EXHIBIT D/200.7	1.9	: ND
CLP-M EXHIBIT D/270.2	0.4	: ND
CLP-M EXHIBIT D/200.7	3.8	: ND
CLP-M EXHIBIT D/279.2	0.3	: ND
CLP-M EXHIBIT D/200.7	1.0	: 119 [/]
	METHODS CLF-M EXHIBIT D/204.2 CLF-M EXHIBIT D/206.2 CLF-M EXHIBIT D/200.7 CLP-M EXHIBIT D/200.7 CLF-M EXHIBIT D/200.7 CLF-M EXHIBIT D/200.7 CLF-M EXHIBIT D/239.2 CLF-M EXHIBIT D/239.2 CLF-M EXHIBIT D/245.5 CLF-M EXHIBIT D/200.7 CLF-M EXHIBIT D/270.2 CLF-M EXHIBIT D/270.2 CLF-M EXHIBIT D/279.2	METHODS mg/Kg CLP-M EXHIBIT D/204.2 0.4 CLP-M EXHIBIT D/206.2 0.4 CLP-M EXHIBIT D/200.7 8.0 CLP-M EXHIBIT D/200.7 0.3 CLP-M EXHIBIT D/200.7 0.2 CLP-M EXHIBIT D/200.7 1.0 CLP-M EXHIBIT D/239.2 0.3 CLP-M EXHIBIT D/245.5 0.2 CLP-M EXHIBIT D/245.5 0.2 CLP-M EXHIBIT D/270.2 0.4 CLP-M EXHIBIT D/270.2 0.4 CLP-M EXHIBIT D/279.2 0.3

ND = NONE DETECTED (BELOW DETECTION LIMITS/

RUSSÈLL D. MOODY

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80621002

DATE: 6-21-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419004

DATE RECEIVED: 4-19-88

DATE SAMPLED: SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH2, 38-68", SOIL SAMPLE

PARAMETER	EXTRACTION / ANALYSIS METHODS	DET. LIMIT mg/Kg	CONC. mg/Kg
ANTIMONY	CLP-M EXHIBIT D/204.2	O.4	: ND
ARSENIC	CLP-M EXHIBIT D/206.2	0.4	: 15.3
BARIUM	CLP-M EXHIBIT D/200.7	8.0	: 219
BERYLLIUM	CLP-M EXHIBIT D/200.7	0.3	: ND
CADMIUM	CLP-M EXHIBIT D/200.7	0.2	: 2.8
CHROMIUM	CLP-M EXHIBIT D/200.7	1.0	: 14.9
LEAD	CLP-M EXHIBIT D/239.2	0.3	: 25.8
MERCURY	CLP-M EXHIBIT D/245.5	0.2	: ND
NICKEL	CLP-M EXHIBIT D/200.7	1.9	: ND
SELENIUM	CLP-M EXHIBIT D/270.2	0.4	: ND
SILVER	CLP-M EXHIBIT D/200.7	3.8	: ND
THALLIUM	CLP-M EXHIBIT D/279.2	0.3	: ND
ZINC	CLP-M EXHIBIT D/200.7	1 . O	. 49

ND = NONE DETECTED (BELOW DETECTION LIMITS)

RUSSELL D. MOODY

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80621003

.

DATE: 6-21-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419005

DATE SAMPLED:

DATE RECEIVED: 4-19-88

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH2, 68-74", SOIL SAMPLE

PARAMETER	EXTRACTION / ANALYSIS METHODS	DET. LIMIT mg/Kg	CONC. mg/Kg
ANTIMONY	CLP-M EXHIBIT D/204.2	0.4	: ND
ARSENIC	CLP-M EXHIBIT D/206.2	0.4	: 12.1 .
BARIUM	CLP-M EXHIBIT D/200.7	8.0	: 199
BERYLLIUM	CLP-M EXHIBIT D/200.7	0.3	: ND
CADMIUM	CLP-M EXHIBIT D/200.7	0.2	: 3.0 ′
CHROMIUM	CLP-M EXHIBIT D/200.7	1.0	: 14.3
LEAD	CLP-M EXHIBIT D/239.2	0.3	: 48.5
MERCURY	CLP-M EXHIBIT D/245.5	0.2	: ND
NICKEL	CLP-M EXHIBIT D/200.7	1.9	: ND
SELENIUM	CLP-M EXHIBIT D/270.2	0.4	: ND
SILVER	CLP-M EXHIBIT D/200.7	3.8	: ND
THALLIUM	CLF-M EXHIBIT D/279.2	0.3	: ND
ZINC	CLP-M EXHIBIT D/200.7	1.0	: 49

ND = NONE DETECTED (BELOW DETECTION LIMITS)

RUSSELL D. MOODY

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80621004

:

DATE: 6-21-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419006

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH3, 0-15", SOIL SAMPLE

PARAMETER	EXTRACTION / ANALYSIS	DET. LIMIT	CONC.	
	METHODS	mg/Kg	mg/Kg	
ANTIMONY	CLP-M EXHIBIT D/204.2	0.4	: ND	
ARSENIC	CLP-M EXHIBIT D/206.2		: 2.7 ⟨	
BARIUM	CLP-M EXHIBIT D/200.7		: 51 √	
BERYLLIUM	CLP-M EXHIBIT D/200.7 CLP-M EXHIBIT D/200.7	0.3	: ND : 1.0	
CADMIUM CHROMIUM	CLF-M EXHIBIT D/200.7	1.0	: 19.2	
LEAD	CLP-M EXHIBIT D/239.2	0.3	: 611 ·	
MERCURY	CLP-M EXHIBIT D/245.5	0.2		
NICKEL	CLP-M EXHIBIT D/200.7	1.9	: ND	
SELENIUM	CLP-M EXHIBIT D/270.2	0.4	: ND	
SILVER	CLF-M EXHIBIT D/200.7	3.8	: ND	
THALLIUM	CLP-M EXHIBIT D/279.2		: ND	
ZINC	CLP-M EXHIBIT D/200.7		: 214 ·	

ND = NONE DETECTED (BELOW DETECTION LIMITS)

RUSSELL D. MOODY

nalytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80621005

DATE: 6-21-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419007

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH3, 15-72", SOIL SAMPLE

PARAMETER	EXTRACTION / ANALYSIS METHODS	DET. LIMIT mg/Kg	CONC. mg/Kg
ANTIMONY	CLP-M EXHIBIT D/204.2	0.4	: ND
ARSENIC	CLP-M EXHIBIT D/206.2	0.4	: 17.6
BARIUM	CLP-M EXHIBIT D/200.7	8.0	: 249 /
BERYLLIUM	CLF-M EXHIBIT D/200.7	0.3	: ND
CADMIUM	CLP-M EXHIBIT D/200.7	0.2	: 2.1
CHROMIUM	CLP-M EXHIBIT D/200.7	1.0	: 14.1
LEAD	CLP-M EXHIBIT D/239.2	0.3	: 29.3
MERCURY	CLP-M EXHIBIT D/245.5	0.2	: ND
NICKEL	CLP-M EXHIBIT D/200.7	1.9	: ND
SELENIUM	CLP-M EXHIBIT D/270.2	0.4	: ND
SILVER	CLP-M EXHIBIT D/200.7	3.8	: ND
THALLIUM	CLP-M EXHIBIT D/279.2	0.3	: ND
ZINC	CLF-M EXHIBIT D/200.7	1.0	± 44 ×

ND = NONE DETECTED (BELOW DETECTION LIMITS)



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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80621006

DATE: 6-21-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419008

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH3, 6-11', SOIL SAMPLE

PARAMETER	EXTRACTION / ANALYSIS	DET. LIMIT	CONC.
	METHODS	mg/Kg	mg/Kg
ANTIMONY ARSENIC BARIUM BERYLLIUM CADMIUM CHROMIUM LEAD MERCURY NICKEL SELENIUM SILVER THALLIUM ZINC	CLF-M EXHIBIT D/204.2 CLP-M EXHIBIT D/206.2 CLP-M EXHIBIT D/200.7 CLP-M EXHIBIT D/200.7 CLP-M EXHIBIT D/200.7 CLP-M EXHIBIT D/200.7 CLP-M EXHIBIT D/239.2 CLP-M EXHIBIT D/239.2 CLP-M EXHIBIT D/245.5 CLP-M EXHIBIT D/200.7 CLP-M EXHIBIT D/270.2 CLP-M EXHIBIT D/270.2 CLP-M EXHIBIT D/279.2 CLP-M EXHIBIT D/279.2 CLP-M EXHIBIT D/279.2	0.4 0.4 8.0 0.3 0.2 1.0 0.3 0.2 1.9 0.4 3.8 0.3 1.0	: ND : 17.2 : 226 : ND : 2.6 : 11.4 : 55.2 : ND : ND : ND : ND : ND

ND = NONE DETECTED (BELOW DETECTION LIMITS)

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726005

.

DATE: 7-26-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419002

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 1,3-14", SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CONC. : mg/L
EP TOXICITY METALS	SW846-1310		
ARSENIC BARIUM CADMIUM CHROMIUM LEAD MERCURY SELENIUM SILVER	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2 EPA 200.7	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L 0.004 mg/L 0.038 mg/L	: ND : 2.13 / : 0.008 / : ND : 0.088 \ : ND : ND : ND

ND = NOT DETECTED (below detection limits)

Russell D. Moodv

nalytical Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726006

DATE: 7-26-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419003

DATE SAMPLED:

DATE RECEIVED: 4-19-88

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 2, 8-38", SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CONC. : mg/L
EP TOXICITY METALS	SW846-1310		
ARSENIC BARIUM CADMIUM CHROMIUM LEAD MERCURY SELENIUM SILVER	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2 EPA 200.7	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L 0.004 mg/L	: ND : 0.63 : 0.003 : ND : ND : ND : ND

ND = NOT DETECTED (below detection limits)

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726007

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DATE: 7-24-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419004

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 2,38-68", SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CONC. : mg/L
EP TOXICITY METALS	SW846-1310		
ARSENIC BARIUM. CADMIUM CHROMIUM LEAD MERCURY SELENIUM SILVER	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2 EPA 200.7	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L 0.004 mg/L	: ND : 1.04 - : 0.008 / : ND : ND : ND : ND

ND = NOT DETECTED (below detection limits)

Russell D. Moody

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726008

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DATE: 7-26-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419005

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 2, 68-74", SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CONC.
EP TOXICITY METALS	SW846-1310		
ARSENIC BARIUM CADMIUM CHROMIUM LEAD MERCURY SELENIUM SILVER	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2 EPA 200.7	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L 0.004 mg/L 0.038 mg/L	: ND : 1.33 : 0.009 : ND : ND : ND : ND

ND = NOT DETECTED (below detection limits)

Bussell D. Moody

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726009

:

DATE: 7-24-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419006

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 3, 0-15", SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CONC. : mg/L
EP TOXICITY METALS	SW846-1310		
ARSENIC BARIUM CADMIUM CHROMIUM LEAD MERCURY SELENIUM SILVER	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2 EPA 200.7	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L 0.004 mg/L 0.038 mg/L	: ND : 0.66 : ND : ND : 0.029 : ND : ND : ND

ND = NOT DETECTED (below detection limits)

Fussell D. Moody

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726010

•

DATE: 7-26-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419007

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 3, 15-72", SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CONC. : mg/L
EF TOXICITY METALS	SW846-1310		
ARSENIC BARIUM: CADMIUM CHROMIUM LEAD MERCURY SELENIUM	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L	: ND : 0.28 / : ND : ND : ND : ND
SELENIUM SILVER	EPA 270.2 EPA 200.7	0.0000 mg/L 0.004 mg/L 0.038 mg/L	

ND = NOT DETECTED (below detection limits)

Russell D. Moody

nalytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726011

DATE: 7-26-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419008

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 3, 6-11', SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CDNC. : mg/L
EP TOXICITY METALS	SW846-1310		
ARSENIC BARIUM CADMIUM CHROMIUM LEAD MERCURY SELENIUM SILVER	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2 EPA 200.7	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L 0.004 mg/L 0.038 mg/L	: ND : 0.15 / : ND : ND : ND : ND : O.004 /

ND = NOT DETECTED (below detection limits)

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80726012

•

DATE: 7-26-88

: ROBERT VANTUYL

QAS SAMPLE #: 80419009

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH 3, 16-17', SOIL SAMPLE

PARAMETER	METHOD	DET. LIMIT	CONC. : mg/L
EP TOXICITY METALS	SW846-1310		
ARSENIC BARIUM. CADMIUM CHROMIUM LEAD MERCURY SELENIUM SILVER	EPA 206.2 EPA 200.7 EPA 200.7 EPA 200.7 EPA 239.2 EPA 245.1 EPA 270.2 EPA 200.7	0.004 mg/L 0.08 mg/L 0.002 mg/L 0.010 mg/L 0.005 mg/L 0.0003 mg/L 0.004 mg/L 0.038 mg/L	: ND / : 0.21 / : ND /

ND = NOT DETECTED (below detection limits)

Russell D. Moody

599-1010

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1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052003

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419002

DATE SAMPLED:

DATE RECEIVED: 04/19/88

SAMPLED BY:

SAMPLE INFORMATION: BH 1, DEPTH 3 - 14", SOIL SAMPLE.

PARAMETER	DE	T. LIMIT		CONC.
PESTICIDES (USEPA CLP - EXHIBI	T D)			
DATE EXTRACTED: 04/25/68		DATE ANALY	YZED	: 05/11/88
alpha-BHC	: 8.	0 ug/Kg 0 ug/Kg	3	ND
beta-BHC	: 8.	0 ug/Kg	:	ND
delts-BHC	: 8,	n ug/Kg	7.	MD
genana - Meth	· 😜 .	C ug/Ne	-	750 ug/Kg 1
Magam, ed. Loen	: 윤.	∂ ug/ka	ż	Sio werker
Aldrín	: 8.	O ug/kg	È	ND
Hayt. acoxide	: 9,	0 lua/Rc	=	ND
Endosulfan i	: 8.	O ug/kg	3	ND
Dieldrin	: 16	.O ug/Kg	:	ND
4,4′-DDE		.O ug/Kg		ND
Endrin	: 16	.O ug/Kā	1	
Endosulfan II	: 16	.O ug∕Kg	2	ND
4.4′~DDD	: 16	.O ug/Kg	:	
Endo: Sulfata	: 16	.C ug∕Ng	2	MD
4,41-DDT		.O ug∕kō	ŧ	ND
Endrin aldehyde	: 16	.O ug/Kg	:	ND
Endrin ketone	: 16	.O ug/Kg	ź	ND
Methoxychlor		.O ug∕Kg		
a. Chiordane	: 30	.O ug/kg	1	MD
: Chlordane		.O ug/Kg		ND
Coy aptrone	: 16	0.0 ūc/Ks	 	ND
hreclar-1016	: 50	.9 ug/Ng	*	ND
Nrowlar-1221	1 30	.≎ ug/Ka	÷	1017 1017 1 4 2 7
	: 70	iù ug∕kt	=	NI)
National Control (CONT)		. Gruper E		NI
Yeatlar-1248	: 80	.O ug/Kq	Ę	NID
Service of Congress and States of		7.0 ug/Ky	4	ND
hrta.br-1260	: 18(3 / Ba/Ka	-	NO

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052012

DATE: 09/05/20

ATTN: ROBERT VANTUYL

GAS SAMPLE #: 80419002

DATE RECEIVED: 04/19/88

SAMPLED BY:

DATE SAMPLED:

SAMPLE INFORMATION: BH 1, DEPTH 3 - 14", SOIL SAMPLE.

PARAMETER	METHOD	DET. LIMIT	CONC.
: 2,4~D	: 8150	: 24 ug/Kg	: ND ·
: 2,4,5-TP (SILVEX)	: 8150	: 3.4 ug/Kg	

Separate 1

ND = NOT DETECTED NA = NOT APPLICABLE

ÁUSSELL D. MOODÝ

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052004

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419003

DATE SAMPLED:

DATE RECEIVED: 04/19/88

SAMPLED BY:

SAMPLE INFORMATION: BH 2, DEPTH 8 - 38", SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
PESTICIDES (USEPA CLP - EX	HIBIT(D)	
DATE EXTRACTED: 04/25/88	DATE ANALY	ZED: 05/11/88
alpha-BHC	: 8.0 ug/Kg	, ND
beta-BHC	: 8.0 ug/Kg	: ND
daltz-980	: 8.0 ug/Kg	i ND
galasa - St. C		2 (1995)
ification and it is to	ត មិន មិន ធ្វើ វិទ្ធិ	. ND
Aldrim	: 월.) ug/Kg	: ND
Hayabi, acopida	: 8.0 ug/Kg	a ND
Endosulta: I	: 8.0 ug/Kg	a MD
Dieldrin	: 16.0 ug/Kg	: ND
4,4'-DDE	: 16.0 ug/Kg	: ND
Endrin	: 16.0 ug/Kg	s MD
Endosulfan II	: 16.0 ug/kg	: ND
4,4′-DDO	: 16.0 ug/Kg	: ND
Shdo. Cultutt	: 16.0 ug/Kg	: ND
4,4'-DDT	: 16.0 ug/Kg	: ND
Endrin aldehyde	: 16.0 ug/Kg	: ND
Endrin ketone	÷ 16.0 ug/Kg	: ND
Methoxychlor	: 80.0 ug/Kg	: ND
a. Chlordane	: 80.0 ug/Kg	-t ND
g. Chlordane	: 80.0 ug/Kg	ŧ ND
Tau tylurus	: 160.0 ug/Kg	: MD
Aranto: Hi014	: 30.0 ug/Kg	: ND
Armalon -1201	: 8070 ug/Kg	: ND
(87)11:01:02:03:012	: 30.0 ug /Kg	: NO
Aradlar All 42		. NE
Arcolon-1248	: 80.0 ug /Kg	: ND
America 1200	# 440 June 189	↑ ND
Orosian-1240	: 160/0 ug)kg	: AD
MATTICE SALES	In will)))/ ₂ /(

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052013

DATE: 88/05/20

ATTN: ROBERT VANTUYL

MAS SAMPLE #: 80419003

DATE RECEIVED: 04/19/88

DATE SAMPLED: SAMPLED BY: SAMPLE INFORMATION: BH 2, DEPTH 8 - 38", SOIL SAMPLE.

PARAMETER METHOD DET. LIMIT CONC.

: 2,4-D
: 2,4-D : 8130 : 24 ug/Kg : ND
: 2,4,5-TP (SILVEX) : 8150 : 3.4 ug/Kg : 33 ug/Kg <

NO = NOT DETECTED NA = NOT APPLICABLE

SUSSELL D. MODDY

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052005

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419004

DATE RECEIVED: 04/19/88

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: BH 2, DEPTH 38 - 68", SOIL SAMPLE.

PARAMETER		DET. LIMIT		CONC.
PESTICIDES (USEPA CLP - EXHIBI	T D)			
DATE EXTRACTED: 04/25/88		DATE ANALY	YZED	: 05/12/88
alpha-BHC		8.0 ug/Kg	= =	ND
beta-BHC	:	8.0 ug/Kg	7	ND
delta-88C	# ii	8.0 ug/Kg	2	ND
gamma-1940	<u>:</u>	8.0 ագ։Κն	5	10 ug/kg/
A company and the man company of the		8.0 ug/Kg	.:	NO
Aldrin	:	8.0 ug/Kg	# -	ND
Hopt: epoxide		8.0 ug/Ka	:	ND
Endosulfan I	=	8.0 ug/Kg	<u>:</u>	MD
Dieldrin	:	16.0 ug/Kg	;	ND
4,4'-DDE		16.0 ug/Kg	, .	ND
Endrin		16.0 ug/Kg	3	ND
Endosulfan II		16.0 ug/Kg	:	ND
4,4'-DDD		16.0 ug/Kg	3	ND
Endo. Sulfate		15.0 ug/Kg		ND
4,4'-DDT	‡	16.0 ug/Kg		ND
Endrin aldehyde		16.0 ug/Kg	5	ND
Endrin ketone	÷	16.0 ug/Kg	3	ND
Methoxychlor	â	80.0 ug/Kg	3	ND
a. Chiordane	2	80.0 ug/Kg	:	ND
g.'Chlordane	, .	60.0 ug/Kg	3	ND
Foraphene		160.0 üç/Kg	4 3	MD
Robalom-1016		80.0 ug/Kg	# %	ND
Araclor-1221		90.0 ug/Kg	1	ND
Prod lor-1232	•	30.0 ug/Kg		ND
Aroulor-1242		30.0 ug/Kg		ND
Proclor-1248		90.0 ug/Kg		ND
Aracler-1254		160 - (V rug)/Kig		MD
hnotler-1260		160.0 ug/Kg	į	180 ug/kg
		(1)	7/)	12. 1
APPLICABLE		1 Vilasell	レノ	1 11771

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052014

DATE: 88/05/20

ATTM: ROBERT VANTUYL

QAS SAMPLE #: 80419004

DATE RECEIVED: 04/19/88

SAMPLED BY:

DATE SAMPLED: SAMPLE INFORMATION: BH 2, DEPTH 38 - 68", SOIL SAMPLE.

PARAMETER	METHOD	DET. LIMIT	CONC.
: 2,4-D	: 8150	: 24 ug/Kg	: ND /
: 2,4,5-TP (SILVEX)	: 8150	: 3.4 ug/Kg	

ND - NOT DEFECTED NA = NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052006

3

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419005

DATE SAMPLED:

DATE RECEIVED: 04/19/88

SAMPLED BY:

SAMPLE INFORMATION: BH 2, DEPTH 68 - 74", SOIL SAMPLE.

	PARAMETER		DET.	LIMIT		CONC.
_	PESTICIDES (USEPA CLP - EXHIBIT	D)		· · · · · · · · · · · · · · · · · · ·		
	DATE EXTRACTED: 04/25/88			DATE ANAL	YZED	: 05/12/88
	alpha-BHC	:	8.0	ug/Kg	3 1	ND
	beta-BHC	:	8.0	ug/Kg	:	ND
	delta-BHC	ır 2	9.0	ug/Kg	<u>.</u>	ND
	gaanaan RMC		6.0	ug/Kg	3	71477
	Plantackom	1	5.0	ug/Kg	1	мO
	Aldrin	:	5.0	ug/Ag	# #	NiD
	Hept. epoxide	2	8.0	ug/Ka		ND
	Endosulfan I	2	2.0	ug/kg	2	MD
	Dieldrin	:	16.0	ug/Kg	;	ND
	4,4'-DDE	2	16.0	ug/Kg	2	ND
	Endrin	:	-16.0	ua/Ka	=	ND
	Endosultan II	5	16.0	ug/Kg	=	ND
	4,4'-DDD	2	16.0	ug/Kg	:	. ND
	Tran. Sulfato			ug/Kg	:	MD
	4,4'-DDT	ž	16.0	ug/Kg	:	ND
	Endrin aldehyde	:	16.0	ug/Kg	:	ND
	Endrin ketone	;	16.0	ug/Kg	:	מא
	Methoxychlor	:	80.0	ug/Kg	e	ND
	a. Chlordane	:	30.0	ug/Kg	;	ND
	g. Chlordane	# u	80.0	ug/Kg	2	ND
	Toxaphone	:	iáO.	0 ug/Kg	ä	ND
	Aretlor-1016	=	30.0	ug/Kg	2	ND
	Arotler-1221			ug∕Kş		1. 4 A.V.
	Arudiar-1252			ugzkç		ND
	Acadian-1242			4 9 /10		NO
	Arcalor-1248			16 / Kg	3	ND
	Anathor-1254			D ug/ y ⊐	# 15	ND
	Procler-1240	i.	160.4	o uo Kg		NE 1
			<i< td=""><td>(1.1</td><td>11</td><td>1/- (</td></i<>	(1.1	11	1/- (
10. T	ACTLICARLE			Lizace "	<u> </u>	1007
12.	Sign management of the second		√.	195ELL by	741 [17]	

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052015

DATE: 88/05/20

ATTN: ROBERT VANTUYL

GAS SAMPLE #: 80417005

DATE RECEIVED: 04/19/88

SAMPLED BY:

DATE SAMPLED: SAMPLE INFORMATION: BH 2, DEPTH 68 - 74", SOIL SAMPLE.

PARAMETER	METHOD	DET. LIMIT	CONC.
: 2,4-D	: 8150	: 24 ug/Kg	: ND ~
: 2,4,5-TP (SILVEX)	: 8150	: 3.4 ug/Kg	

MD = MOT DETECTED NA = NOT AFFLICABLE

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 6052007

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419006

DATE SAMPLED:

DATE RECEIVED: 04/19/68

SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 0 - 15", SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
PESTICIDES (USEPA CLP - EXHIBI	Т D)	
DATE EXTRACTED: 04/25/88	DATE ANALY	YZED: 05/11/88
alpha-BHC	: 8.0 ug/Kg	: ND
beta-BHC	: 8.0 ug/Kg	: ND
delta-BHC	: 8.0 ug/Ka	: ND
taasa-DuC	: 2.0 uš/kš	4 ND
Hesterly	a S.O Wā/Kā	· ND
aldrin	: 8.0 ug/kg	: ND
Heut, epoxide	1 2.0 ug/Kg	: 1.605 ug/Ka/
Endosulfan I	: 8.0 ug/Kg	: NÔ
Dieldrin	: 16.0 ūg/kg	: ND
4,4'-DDE	: 16.0 ug/Kg	: ND
Endrin	: 16.0 ug/Kg	: ND
Endosulfan II	: 16.0 ug/Kg	: ND
4,4'-DDD	: 16.0 ug/Kg	: ND
Endo: Sulfate	: 16.0 ug/Kģ	s ND
4,4'-DDT	: 16.0 ug/Kg	: ND
Endrin aldehyde	: 16.0 ug/Kg	: ND
Endrin ketone	: 16.0 ug/Kg	: ND
Methoxychlor	: 80.0 ug/Kg	: ND
a. Chlordane	: 80.0 ug/Kg	: ND
g. Chlordane	: 80.0 ug/Kg	: ND
Toxaphene	: 160.0 ug/Kg	: ND
Ancolon-1016	: 80.0 ug/K g	: MD
Arcolor-1221	: 30 0 ug/K q	: ND
Arction-1232	: 50.0 ug/Kg	z ND
Ancalar-1240		: NO
Arecier-1248	: 80.0 <u>uq</u> /Kg	: ND
Anoclar-1204	: 160/0 up/Kg	a MD
Anocion-1240	: 16/0.0 y/g/Kg	· ND
		11/1/2/
OT AFFLICABLE	1 Marike 1	1 (677)
	/ Burning	AUGUA Y

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052016

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419006

DATE RECEIVED: 04/19/88

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 0 - 15", SOIL SAMPLE.

PARAMETER	METHOD	DET. LIMIT	CONC.
2,4-D	: 8150	: 24 ug/Kg	: 31 ug/Kg/
2,4,5-TP (SILVEX)	: 8150	: 3.4 ug/Kg	: ND

ND = NOT DETECTED NA = NOT APPLICABLE

RUSSELL D. MOODY

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 6052008

DATE: \$8/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419007

DATE RECEIVED: 04/19/88

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 15 - 72", SOIL SAMPLE.

PARAMETER		DET. LIMIT	CONC.
PESTICIDES (USEFA CLP - E	XHIBIT D)		
DATE EXTRACTED: 04/25/88		DATE ANAL	.YZED: 05/11/88
alpha-8HC		8.0 ug/Kg	; ND
beta-BHC		8.0 ug/Kg	: ND
delta-BHC		8.0 ug/Kg	: ND
gamma-BHC		3.0 ug/Kg	# \\! <u>\</u>
Heshadion	.: 4	3.0 Lg/Kg	: NO
Alamin	2	S.O eg/Kg	: NIJ
Hept. apoxide	<i>3</i>	8.0 ug/Kg	: ND
Endosulfan I	3	8.0 ug/Kg	: ND
Dieldrin	:	16.0 ug/Kg	: ND
4,4'-DDE	*	16.0 ug/Kg	: ND
Endrin	1	16.0 uā/Kā	
Endosulfan II	±	16.0 ug/Kg 16.0 ug/Kg	: ND
4,4'-DDD	=	16.0 ug/Kg	; ND
Endo. Sulfate	- *	16.0 ug/Kg	s ND
4.4'-DDT		16.0 ug/Kg	
	3		1 (12)
Endrin aldehyde		16.0 ug/Kg	
Endrin ketone	a n	16.0 ug/Kg	: ND
Methoxychlor		80.0 ua/ka	: MD
a. Chlordane	# 14	80.0 ug/Kg	: ND
g. Chlordane	2	80.0 ug/Kg	: ND
Toxaphene	2 :	160.0 ug/Kg	: ND
Anadlor-1016	::	90.0 ug/Kg	. ND
Areclar-1201		20.0 ug/Kg	: ND
Ores: 1.5r-1272		30.0 ug/Kg	i ND
Arotler-1242		80.0 ua/Ka	i MD
Arctlor-1248		80.0 u <u>c</u> /ka	t ND
Anaclar-1254		160.0 ua/Ka	: ND
Anos Ion-1240		160 /0 uc/kg	: 970 Jug/Kg
and the state of t	<u> </u>		
APPLICABLE		Just 1/1	21/47
BETECHED		VRUBERLL D.	MUCDY /

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052017

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419007

DATE RECEIVED: 04/19/88

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 15 - 72", SOIL SAMPLE.

PARAMETER	METHOD	DET, LIMIT	CONC.
: 2,4-D	: 8150	: 24 uq/Ka	: ND
: 2,4,5-TP (SILVEX)	: 8150	: 3.4 ūg/Kg	: ND

NO = NOT DETECTED NA = NOT APPLICABLE

RUSSELL D. MOODY

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SERVICE TO: DEFFENBAUGH IND.

- MOT DETECTED

REPORT #: 6052009

DATE: 68/05/20

ATTN: ROBERT VANTUYL

DATE RECEIVED: 04/19/88 QAS SAMPLE #: 80419008

SAMPLED BY: DATE SAMPLED:

SAMPLE INFORMATION: BH 3, DEPTH 6 - 11', SOIL SAMPLE.

FARAMETER		DET. LIMIT	CONC.
PESTICIDES (USEPA CLP - EXHIBIT	D)		
DATE EXTRACTED: 04/25/88		DATE ANALY	ZED: 05/12/88
alpha-8HC	,	8.0 ug/Kg	: ND
beta-BHC	,	8.0 ug/Kg	: ND
delta-BHC	;	8.0 ug/Kg	: ND
gamma-BHC	n er	2.0 ug/Kg	: MD
Hoptacior	.1 4	8.0 ug/Kg	: ND
Aldrin	2	8.0 ug/Kā	a ND
Hept. epoxide		3.0 ug/kg	ŧ NΩ
Endosulfan I		8.0 ug/Kg	
Dieldrin		16.0 ug/Kg	
4,4'-DDE		16.0 ug/Kg	
Endrin		16.0 ug/Kg	: ND
Endosulfan II		16.0 ug/Kg	: ND
4,4'-DDD		16.0 ug/Kg	: ND
Endo. Sulfate		16.0 ug/Kg	s ND
4,4'-DDT		16.0 ug/Kg	: ND
Endrin aldehyde	:	16.0 ug/Kg	: ND
Endrin ketone		14.0 ug/Kg	
Methoxychlor		80.0 ug/Kg	
a. Chlordane		90.0 ug/Kg	: ND
g. Chlordane		80.0 ug/Kg	: ND
Toxaphene		160.0 ūg/Kā	: ND
Arcclor-1016		80.0 ug/Kg	: ND
Arsolor-1221	:	ec.o uģ∕Kģ	: ND
Aroclor-1232	u u	80.0 ug/Kg	: MD
Aroclar-1242		20.0 ug/Kg	i ND
Arcalor-1249		80.0/QaXKg	; ND
Aroclor-1254		150/0 ūg)/Kg	; ND
Anoclor-1260		150.0 uŽ/Kģ	: 570 ug/Kg·
T'AFFLICABLE F DETECTED		FUSSELL D.	MOODY

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052018

3

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419008

DATE RECEIVED: 04/19/88

SAMPLED BY:

DATE SAMPLED:

SAMPLE INFORMATION: BH 3, DEPTH 6 - 11', SOIL SAMPLE.

PARAMETER	METHOD	DET. LIMIT	CONC.
: 2,4-0	: 8150	: 24 ug/Kg	: ND = = 1
: 2,4,5-TP (SILVEX)	: 8150	: 3.4 ug/Kg	

ND ≈ NOT DETECTED NA = NOT APPLICABLE

RUSSELL D. MÓODY

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 6052010

.

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419009

DATE SAMPLED:

ND = NOT DETECTED

DATE RECEIVED: 04/19/88

SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 16 - 17', SOIL SAMPLE.

_	PARAMETER		DET. LIMIT		CONC.
	PESTICIDES (USEPA CLP - EXHIBIT	D)			
	DATE EXTRACTED: 04/25/88		DATE ANALY	ZED	: 05/12/88
	alpha-BHC		8.0 ug/Kg	:	ND
	beta-BHC	ŧ		:	
	delta-BHC	:		:	מא
* a.	gamma-BHC	:	8.0 ug/Kg	:	MD
A 3	Heptaclor	2	8.0 ug/Kg	:	
₹	Aldrin	=	8.0 ug/Kg	F 2	ND
	Hapt. epoxide	:	8.0 ug/Kg		ND
	Endosulfan I	=	8.0 ug/Kg		ND
	Dieldrin	:	16.0 ug/Kg		ПD
	4,4'-DDE	:	16.0 ug/Kg		ND
	Endrin	=	16.0 ug/Kg		ND .
	Endosulfan II		16.0 ug/Kg		ND
	4,4'-DDD	:	16.0 ug/Kg		ND
	Endo. Sulfate	*	16.0 ug/Kg	:	ND
	4,4'-DDT	i i	16.0 ug/Kg	:	ND
	Endrin aldehyde		16.0 ug/Kg		ND
	Endrin ketone	Ë		:	
	Methoxychlor		<u>-</u> '	:	
	a. Chlordane			• :	
	g. Chlordane		80.0 ug/Kg		ND
	Toxaphene	7	160.0 ug/Kg	:	ND
	Aroclor-1016		80.0 ug/Kg		ND
	Aroclor-1221		80.0 ug/Kg		ND
	Aroclor-1232		80.0 ug/Kg		ND
	Aroclor-1242			5	ND
	Aroclor-1248		80.0 ug/Kg		ND
	Aroclor=1254		160.9 ug/Kg		ND
	Aroclor-1260	:	160,0 ug/kg	^ ·	250 ug/Kg /
) NA = NOT:	APPLICABLE		Tunolly		Vard

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8052019

π

DATE: 88/05/20

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419009

DATE RECEIVED: 04/19/88

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 16 - 17', SOIL SAMPLE.

PARAMETER	METHOD	DET. LIMIT	CONC.
: 2,4-D	: 8150	: 24 ug/Kg	: <24 ug/Kg ′
: 2,4,5-TP (SILVEX)	: 8150	: 3.4 ug/Kg	: ND

ND = NOT DETECTED NA = NOT APPLICABLE

RUSSELL D. MOODY

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051904

DATE: 88/05/19

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419006

DATE RECEIVED: 04/19/88

DATE SAMPLED: SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 0 - 15", DATE ANALYZED: 05/10/88

SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	(ug/Kg)	(ug/Kg)
CHLOROMETHANE BROMOMETHANE VINYL CHLORIDE CHLOROETHANE METHYLENE CHLORIDE ACETONE CARBON DISULFIDE 1,1-DICHLOROETHENE	: 2000 ug/Kg : 2000 ug/Kg : 2000 ug/Kg : 2000 ug/Kg : 1000 ug/Kg : 2000 ug/Kg : 1000 ug/Kg : 1000 ug/Kg	: ND
1,1-DICHLOROETHANE 1,2-DICHLOROETHENE CHLOROFORM 1,2-DICHLOROETHANE 2-BUTANGNE 1,1,1-TRICHLOROETHANE CARBON TETRACHLORIDE	: 1000 ug/Kg : 1000 ug/Kg : 1000 ug/Kg : 1000 ug/Kg : 2000 ug/Kg : 1000 ug/Kg : 1000 ug/Kg	: ND : ND : ND : ND

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051904

PAGE 2

DATE: 88/05/19

PARAMETER	DET. LIMIT	CONC.
	(ug/Kg)	(ug/Kg)
VINYL ACETATE	: 2000 ug/Kg	: ND
BROMODICHLOROMETHANE	: 1000 ug/Kg	: ND
1,2-DICHLOROPROPANE	: 1000 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE	: 1000 ug/Kg	: ND
TRICHLOROETHENE	: 1000 ug/Kg	: 37,600 ug/Kg
DIBROMOCHLOROMETHANE	: 1000 ug/Kg	: ND
1,1,2-TRICHLOROETHANE	: 1000 ug/Kg	: ND
BENZENE	: 1000 ug/Kg	: 1,620 ug/Kg ~
TRANS-1,3-DICHLOROPROPENE	: 1000 ug/Kg	: ND
BROMOFORM	: 1000 ug/Kg	: ND
4-METHYL-2-PENTANONE	: 2000 ug/Kg	: ND
2-HEXANONE	: 2000 ug/Kg	: ND
TETRACHLOROETHENE	: 1000 ug/Kg	:116,000 ug/Kg
1,1,2,2-TETRACHLOROETHANE	: 1000 ug/Kg	: ND
TOLUENE	: 1000 ug/Kg	: 48,000 ug/Kg ^r
CHLOROSENZENE	: 1000 ug/Kg	: ND
ETHYLBENZENE	: 1000 ug/Kg	: 16,300 ug/Kg
STYRENE	: 1000 ug/Kg	: ND
TOTAL XYLENES	: 1000 ug/Kg	:574,000 ug/Kg/

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051901

DATE: 88/05/19

ATTN: ROBERT VANTUYL

GAS SAMPLE #: 80419002

DATE SAMPLED:

DATE RECEIVED: 04/19/88

SAMPLED BY:

SAMPLE INFORMATION: BH 1, DEPTH 3 - 14", DATE ANALYZED: 05/12/88

SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	(ug/Kg)	(ug/Kg)
CHLOROMETHANE	: 200 ug/Kg	. ND
BROMOMETHANE	: 200 ug/Kg	: ND
VINYL CHLORIDE	: 200 ug/Kg	2 N <u>D</u>
CHLORGETHAME	: 200 ug/Kg	a Nail
METHY, ENE OHLORIDE	: <u>190</u> ug/e z	. 7 1
ACETONE	: 200 ug/Kg	: ND
CARBON DISULFIDE	: 100 ug/Kg	i NT
1,1-DICHLOROETHENE	: 100 ug/Kg	: ND
1,1-DICHLOROETHANE	: 100 ug/Kg	: ND
1,2-DICHLOROETHENE	: 100 ug/Kg	: ND
CHLOROFORM	: 100 ug/Kg	: ND
1,2-DICHLOROETHANE	: 100 ug/Kg	: ND
2-BUTANONE	: 200 ug/Kg	: ND
1,1,1-TRICHLOROETHANE	: 100 ug/Kg	: ND
CARBON TETRACHLORIDE	: 100 ug/Kg	: ND

ND - MOT DELECTED

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051901

PAGE 2

DATE: 88/05/19

PARAMETER	DET. LIMIT	CONC.
	(ug/Kg)	(ug/Kg)
VINYL ACETATE	: 200 ug/Kg	: ND
BROMODICHLOROMETHANE	: 100 ug/Kg	: ND
1,2-DICHLOROPROPANE	: 100 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE	: 100 ug/Kg	: ND
TRICHLOROETHENE	: 100 ug/Kg	: ND
DIBROMOCHLOROMETHANE	: 100 ug/Kg	
1,1,2-TRICHLOROETHANE	: 100 ug/Kg	
BENZENE	: 100 ug/Kg	
TRANS-1,3-DICHLOROPROPENE	: 100 ug/Kg	
RECHERE	; 100 ug/Kg	
4-METHYL-2-PENTANONE	: 200 ug/Kg	
2-HEXANONE	: 200 ug/Kg	
TETRACHLOROETHENE	: 100 ug/Kg	/
1,1,2,2-TETRACHLORGETHANE	; 100 ug/Kg	
and growing and growing them to the Control of the	: 100 bg / Mg	
CHLOROBENZENE	: 100 ug/Kg	
ETHYLDENZENE	: 100 ug/Kg	i ND /
STYRENE	: 100 ag/Kg	1
TOTAL XYLENES	: 100 ug/Kg	: 16,400 ug/Kg 🗸

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND

REPORT #: 80630002 ...

DATE: 6-30-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419003

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: RADIUM, BH2, 8 - 38" DATE ANALYZED: 5-12-88

SOIL SAMPLE

PARAMETER	DET. LIMIT : ug/Kg	CONC. : ug/Kg
VOLATILES METHOD: SW 846 - 8240		
CHLOROMETHANE	: 200	: ND
BROMOMETHANE	: 200	: ND
VINYL CHLORIDE	: 200	: ND
CLOROETHANE	: 200	: ND
METHYLENE CHLORIDE	: 100	: ND
ACETONE	: 200	: ND
CARBON DISULFIDE	: 100	: ND
1,1-DICHLOROETHENE	: 100	: ND
1,1-DICHLOROETHANE	: 100	: ND
1,2-DICHLOROETHENE	: 100	: ND
CHLOROFORM	: 100	: ND
1,2-DICHLOROETHANE	: 100	: ND
2-BUTANONE	: 200	: ND
1,1,1-TRICHLOROETHANE	: 100	: ND
CARBON TETRACHLORIDE	: 100	: ND

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND

REPORT #: 80630002 |

ATTN: ROBERT VANTUYL

DATE: 6-30-88

PARAMETER	DET. LIMIT	CONC.
	: ug/Kg	: ug/Kg
JINYL ACETATE	: 200	: ND
BROMODICHLOROMETHANE	: 100	: ND
1,2-DICHLOROPROPANE	: 100	: ND
CIS-1,3-DICHLOROPROPENE	: 100	: ND
TRICHLOROETHANE	: 100	: ND
DIBROMOCHLOROMETHANE	: 100	: ND
1,1,2-TRICHLOROETHANE	: 100	: ND
BENZENE	: 100	: ND
TRANS-1.3-DICHLOROPROFENE	: 100	: ND
BROMOFORM	: 100	: ND
4-METHYL-2-PENTANONE	: 200	: ND
2-HEXANONE	: 200	: ND
TETRACHLOROETHENE	: 100	: ND
1,1,2,2-TETRACHLOROETHANE	: 100	: ND
TÖLÜENE	: 100	: 679
CHLOROBENZENE	: 100	: ND
ETHYLBENZENE	: 100	: 364
STYRENE	: 100	: ND
TOTAL XYLENES	: 100	: 10,400

ND = NOT DETECTED NA = NOT APPLICABLE



SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051902

DATE: 88/05/19

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419004

DATE RECEIVED: 04/19/88

DATE SAMPLED: SAMPLED BY:

SAMPLE INFORMATION: BH 2, DEPTH 38 - 68", DATE ANALYZED: 05/12/88

SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	(ug/Kg)	(ug/Kg)
CHLOROMETHANE	: 200 ug/Kg	: ND
BROMOMETHANE	: 200 ug/Kg	: ND
VINYL CHLORIDE	: 200 ug/Kg	: ND
GHLOROETHANE	: 200 ug/Kg	: ND
METHYLENE CHLORIDE	: i00 ug/Kg	: ND
ACETONE	: 200 ug/Kg	: ND
CARBON DISULFIDE	: 100 ug/Kg	: ND
1,1-DICHLOROETHENE	: 100 ug/Kg	: ND
1,1-DICHLOROETHANE	: 100 ug/Kg	: ND
1,2-DICHLOROETHENE	: 100 ug/Kg	: ND
CHLOROFORM	: 100 ug/Kg	: ND
1.2-DICHLOROETHANE	: 100 ug/Kg	: ND
2-BUTANONE	: 200 ug/Kg	: ND
1,1,1-TRICHLOROETHANE	: 100 ug/Kg	: ND
CÁRBON TETRACHLORIDE	: 100 ug/Kg	: ND

ND = NOT DETECTED YA = NOT APPLICABLE



SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051902

PAGE 2

DATE: 88/05/19

PARAMETER	DET. LIMIT	CONC.
•	(ug/Kg)	(ug/Kg)
VINYL ACETATE	: 200 ug/Kg	: ND
BROMODICHLOROMETHANE	: 100 ug/Kg	: ND
1,2-DICHLOROPROPANE	: 100 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE	: 100 ug/Kg	: ND
TRICHLOROETHENE	: 100 ug/Kg	
DIBROMOCHLOROMETHANE	: 100 ug/Kg	
1,1,2-TRICHLOROETHANE	: 100 ug/Kg	
BENZENE	: 100 ug/Kg	
TRANS-1,3-DICHLOROPROPENE	: 100 ug/Kg	: ND
BROMOFORM	: 100 ug/Kg	: ND
4-METHYL-2-PENTANONE	: 200 ug/Kg	
2-HEXANONE	: 200 ug/Kg	
TETRACHLOROETHENE	: 100 ug/Kg	
1,1,2,2-TETRACHLORGETHANE	: 100 ug/Kg	
TÓLÚZŇE	: 100 ug/Kg	
CHLOROBENZENE	: 100 ug/Kg	
ETHYLBENZENE	: 100 ug/Kg	: 250 ug/Kg
STYRENE	: 100 ug/kg	
TOTAL XYLENES	: 100 ug/Kg	

ND = NOT DETECTED NA = NOT APPLICABLE



SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051903

DATE: 88/05/19

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419005

DATE RECEIVED: 04/19/88

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: BH 2, DEPTH 68 - 74", DATE ANALYZED: 05/12/88

SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	(ug/Kg)	(ug/Kg)
CHLOROMETHANE BROMOMETHANE VINYL CHLORIDE CHLOROETHANE METHYLENE CHLORIDE ACETONE CARBON DISULFIDE 1,1-DICHLOROETHENE 1,1-DICHLOROETHENE 1,2-DICHLOROETHENE CHLOROFORM	: 200 ug/Kg : 200 ug/Kg : 200 ug/Kg : 200 ug/Kg : 100 ug/Kg : 100 ug/Kg : 100 ug/Kg : 100 ug/Kg : 100 ug/Kg : 100 ug/Kg	: ND
1,2-DICHLOROETHANE 2-BUTANONE 1,1,1-TRICHLOROETHANE CARBON TETRACHLORIDE	: 100 ug/Kg : 200 ug/Kg : 100 ug/Kg : 100 ug/Kg	: ND : ND

ND = NOT DETECTED NA = NOT APPLICABLE



SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051903

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DATE: 88/05/19

PARAMETER	DET. LIMIT	CONC.
•	(ug/Kg)	(ug/Kg)
VINYL ACETATE	: 200 ug/Kg	: ND
BROMODICHLOROMETHANE	: 100 ug/kg	
1,2-DICHLOROPROPANE	: 100 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE	: 100 ug/Kg	: ND
TRICHLOROETHENE	: 100 ug/Kg	: ND
DIBROMOCHLOROMETHANE	: 100 ug/Kg	: ND
1,1,2-TRICHLOROETHANE	: 100 ug/Kg	: ND
BENŻENE	: 100 ug/kg	: ND
TRANS-1,3-DICHLOROPROFENE	: 100 ug/Kg	: ND
BROMOFORM	: 100 ug/Kg	: ND
4-METHYL-2-PENTANONE	: 200 ug/Kg	: ND
2-HEXANONE	: 200 ug/Kg	: ND
TETRACHLOROETHENE	: 100 ug/Kg	
i,i,2,2-TETRACHLOROETHANE	: 100 ug/Kg	: AD
TOLÜENE	: 100 ug/Kg	: 127 ug/Kg
CHLOROBENZENE	: 100 ug/Kg	
ETHYLBENZENE	: 100 ug/Kg	
STYRENE	: 100 ug/Kg	_
TOTAL XYLENES	: 100 ug/Kg	

ND = NOT DETECTED NA = NOT APPLICABLE

Puecell D. Moody



SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051905

DATE: 88/05/19

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419007

DATE RECEIVED: 04/19/88

DATE SAMPLED:

SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 15 - 72", DATE ANALYZED: 05/10/88

SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	(ug/Kg)	(ug/Kg)
CHLOROMETHANE BROMOMETHANE VINYL CHLORIDE CHLOROETHANE METHYLENE CHLORIDE ACETONE CARBON DISULFIDE 1,1-DICHLOROETHENE 1,1-DICHLOROETHANE 1,2-DICHLOROETHENE CHLOROFORM 1,2-DICHLOROETHANE 2-BUTANONE 1,1,1-TRICHLOROETHANE CARBON TETRACHLORIDE	: 200 ug/Kg : 200 ug/Kg : 200 ug/Kg : 200 ug/Kg : 100 ug/Kg	: ND : ND : ND : ND : ND : ND : ND : ND

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051905

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DATE: 88/05/19

PARAMETER	DET. LIMIT	CONC.
	(ug/Kg)	(ug/Kg) ´
VINYL ACETATE	: 200 ug/Kg	: ND
BROMODICHLOROMETHANE	: 100 ug/Kg	: ND
1,2-DICHLOROPROPANE	: 100 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE	: 100 ug/Kg	: ND
TRICHLOROETHENE	: 100 ug/Kg	: ND
DIBROMOCHLOROMETHANE	: 100 ug/Kg	: ND
1,1,2-TRICHLOROETHANE	: 100 ug/Kg	: ND
BENZENE	: 100 ug/Kg	: ND
FRANS-1,3-DICHLOROPROPENE	: 100 ug/kg	: ND
BROMOFORM	: 100 ug/Kg	: ND
4-METHYL-2-PENTANONE	: 200 ug/Kg	: ND
2-HEXANONE	: 200 ug/Kg	
TETRACHLOROETHENE	: 100 ug/Kg	
1,1,2,2-TETRACHLOROETHANE	: 100 ug/Kg	
TÖLÜENE	: 100 ug/Kg	
CHLOROSENZENE	: 100 ug/Kg	
ETHYLBENZENE	: 100 ug/Kg	
STYRENE	: 100 ug/kg	
TOTAL XYLENES	: 100 ug/Kg	,

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051906

DATE: 88/05/19

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419008

DATE RECEIVED: 04/19/88

DATE SAMPLED: SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 6 - 11', DATE ANALYZED: 05/12/88

SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	(ug/Kg)	(ug/Kg)
CHLOROMETHANE	: 200 ug/Kg	: ND
BROMOMETHANE	: 200 ug/Kg	
VINYL CHLORIDE	: 200 ug/Kg	
CHLOROETHANE	: 200 ug/Kg	
METHYLENE CHLORIDE	: 100 ug/Kg	
ACETONE	: 200 ug/Kg	
CARBON DISULFIDE	: 100 ug/Kg	
1,1-DICHLOROETHENE	: 100 ug/Kg	
1,1-DICHLOROETHANE	: 100 ug/Kg	
1,2-DICHLOROETHENE	: 100 ug/Kg	: ND
CHLOROFORM	: 100 ug/Kg	: ND
1,2-DICHLOROETHANE	: 100 ug/Kg	: ND
2-BUTANONE	: 200 ug/Kg	: ND
1,1,1-TRICHLOROETHANE	: 100 ug/Kg	: ND
CARBON TETRACHLORIDE	: 100 ug/Kg	: ND

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051906

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PARAMETER	DET. LIMIT	CONC.
·	(ug/Kg)	(ug/Kg)
VINYL ACETATE	: 200 ug/Kg	: ND
BROMODICHLOROMETHANE	: 100 ug/Kg	: ND
1,2-DICHLOROPROPANE	: 100 ug/Kg	: ND
CIS-1,3-DICHLOROPROPENE	: 100 ug/Kg	: ND
TRICHLOROETHENE	: 100 ug/Kg	
DIBROMOCHLOROMETHANE	: 100 ug/Kg	: ND
1,1,2-TRICHLOROETHANE	: 100 ug/Kg	
BENZENE	: 100 ug/Kg	: ND
TRANS-1,3-DICHLOROPROPENE	: 100 ug/Kg	: ND
BROMOFOŔM	: 100 ug/Kg	: ND
4-METHYL-2-FENTANONE	: 200 ug/Kg	: ND
2-HEXANONE	: 200 ug/Kg	: ND
TETRACHLOROETHENE	: 100 ug/Kg	: ND
1,1,2,2-TETRACHLOROETHANE	: 100 ug/Kg	: ND
TÓLÚENE	: 100 ug/Kg	: ND
CHLOROBENZENE	: 100 ug/Kg	: ND
ETHYLBENZENE	: 100 ug/Kg	
STYRENE	: 100 ug/Kg	
TOTAL XYLENES	: 100 ug/Kg	: 3,160 ug/Kg

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051909

DATE: 88/05/19

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419009

DATE RECEIVED: 04/19/88

DATE SAMPLED: SAMPLED BY:

SAMPLE INFORMATION: BH 3, DEPTH 16 - 17', DATE ANALYZED: 05/12/88

SOIL SAMPLE.

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 8240)	(ug/Kg)	(ug/Kg)
CHLOROMETHANE	։ 200 պզ/Kg	: ND
BROMOMETHANE	: 200 ug/Kg	
VINYL CHLORIDE	: 200 ua/Kg	
CHLOROETHANE	: 200 ug/Kg	
METHYLENE CHLORIDE	: 100 ug/Kg	
ACETONE	: 200 ug/Kg	: ND
CARBON DISULFIDE	: 100 ug/Kg	: ND
1,1-DICHLOROETHENE	: 100 ug/Kg	# ND
1,1-DICHLOROETHANE	: 100 ug/Kg	: ND
1.2-DICHLOROETHENE	: 100 ug/Kg	: ND
CHLOROFORM	: 100 ug/Kg	: ND
1,2-DICHLOROETHANE	: 100 ug/Kg	: ND
2-BUTANONE	: 200 ug/Kg	: ND
1,1,1-TRICHLOROETHANE	: 100 ug/Kg	: ND
CARBON TETRACHLORIDE	: 100 ug/Kg	: ND

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: RADIUM PETROLEUM

REPORT #: 8051909

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DATE: 88/05/19

PARAMETER	DET. LIMIT	CONC.
•	(ug/Kg)	(ug/Kg)
VINYL ACETATE	: 200 ug/Kg	: ND
BROMODICHLOROMETHANE	: 100 ug/Kg	: ND
1,2-DICHLOROPROPANE	: 100 ug/Kg	
·	: 100 ug/Kg	
TRICHLOROETHENE	: 100 ug/Kg	
DIBROMOCHLOROMETHANE	: 100 ug/Kg	
1,1,2-TRICHLOROETHANE	: 100 ug/Kg	
BÉNŽENE	: 100 ug/Kg	
TRANS-1,3-DICHLOROPROPENE	: 100 ug/Kg	
BROMOFORM	: 100 ug/kg	
4-METHYL-2-PENTANONE	: 200 ug/Kg	
2-HEXANONE	: 200 ug/Kg	: ND
TETRACHLOROETHENE	: 100 ua/Ka	: ND
1,1,2,2-TETRACHLOROETHANE	: 100 ug/Kg : 100 ug/Kg	: ND
TOLUENE	: 100 ug/Kg	: 169 ug/Kg 📝
CHLOROBENZENE	: 100 ug/Kg	
ETHYLBENZENE	: 100 ug/Kg	
STYRENE	: 100 ug/Kg	
TOTAL XYLENES	: 100 ug/Kg	: 321 ug/Kg

ND = NOT DETECTED NA = NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614004

DATE: 6-14-86

ATTN: BOB VANTUYL

QAS SAMPLE #: 80419002

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH1, 3'-14', SOIL SAMPLE

DATE EXTRACTED:

DATE ANALYZED: 6-7-88

METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL MEDIUM PREP

PARAMETER	DET. LIMIT : ug\Kg	CONC : ug\Kg
PHENOL	; 4,000	: ND /
BIS(2-CHLGRGETHYL)ETHER	•	i ND
2-CHLOROPHENOL	: 4,000	: ND
1.3 DICHLORGBENZENE	: 4,000	: NO
1, * DICHLOROBENZENE	: 4,000	: ND
BENZYL ALCOHOL	2 4,000	: ND
1.2 DICHLOROBENZENE	: 4,000	s ND
2 METHYLPHENOL	: 4,000	: ND
BIS(2-CHLOROISOPROPYL)ETHER	: 4,000	i ND
4 METHYLPHENOL	: 4,000	: ND
N-NITROSO-DI-N-FROFYLAMINE	: 4,000	a ND
HEXACHLOROETHANE	: 4,000	: ND
NITROBENZENE	: 4,000	; ND
ISOPHORONE	: 4,000	: ND
2 NITROPHENOL	: 4,000	a ND
2,4 DIMETHYLPHENOL	: 4,000	: ND
BÉNZOIC ACID	: 20,000	: ND
BIS(2-CHLORGETHOXY)METHANE	: 4,000	: ND
2.4 DICHLOROPHENOL	: 4,000	: ND
1,2,4 TRICHLOROBENZENE	: 4,000	a MD
VÁPHTHALENE	: 4,000	: ND
4 CHLOROANILINE	: 4,000	3 MD
HEXACHLOROBUTADIENE	: 4,000	: ND
4 CHLORO-3-METHYLPHENOL	: 4,000	; MD
2 METHYLNAPHTHALENE	: 4,000	: ND
HEXACHLOROCYCLOPENTAD/ENE	\$ 4 ,000	2 ND
2,4,5 TRICHLOROPHENOL	: 4,000	: MD
2,4,5 TRICHLOROPHENOL	: 20,000	: ND
2 CHLOROMAPHTHALENE	A, 000	; ND

Russall D. Mosdy

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614004

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DATE: 6-14-88

PARAMETER	DET. LIMIT CO	
	: ug\Kg	: ug\Kg
2 NITROANILINE	: 20,000	: ND
DIMETHYLPHTHALATE	: 4,000	: ND V
ACENAPHTHYLENE	: 4,000	: ND
2,6 DINITROTOLUENE	: 4,000	: ND
3 NITROANILINE	: 20,000	: MD
ACENAPHTHENE	: 4,000	: ND
2,4 DINITROPHENOL	: 20,000	: ND
4 NITROPHENOL	: 20,000	: ND
DIBENZOFURAN	: 4,000	: ND
2,4 CINITROTOLUENE	: 4,000	a ND
DIETHYLPHTHALATE	: 4,000	a ND
4 CHILGROPHENYLPHENYLETHER	: 4,000	: ND
FLUORENE	: 4,000	t ND
4 MITHOANILINE	• 20,000	# NO
4,6 DINITRO-2-METHYLPHENOL	: 20,000	z NED
N-MITROSODIPHENYLAMINE	: 4,000	s ND
A SEGMOPHEMATCHEMATETHEK	: 4,000	a ND
HEXACHLOROBENZENE	: 4,000	: MD
PENTACHLOROPHENCL	: 20,000	a ND
PHEMATHRENE	: 4,000	: ND
ANTHRACENE	: 4 ₀ 000	s ND
OI-M-BUTYLPHTHALATE	: 4,000	r ND
FLUORANTHENE	: 4,000	i MD
PYREME	: 4,000	: ND
EUTYLBENZYLPHTHALATE	: 4,000	: ND
3,3' DICHLOROBEMZIDINE	: 8,000	: ND
BENZO (A) ANTHRACENE	: 4,000	: ND
CHRYSENE	: 4,000	: ND
BIS(2-ETHYLHEXYL)PHTHALATE	: 4,000	: ND
DI-N-CCTYLPHTHALATE	: 4,000	: ND
SENZO(B)FLUORANTHENE	: 4,000	: ND
BENZO(K)FLUCRANTHENE	: 4,000	; ND
BENZO(A)PYRENE	: 4,000	: ND
INDEMO(1,2,3-CD)PYRENE	: 4,000	a ND
DIBENZ(A,H)ANTHRACENE	: 4,000	: ND
BENZO(G,H,I)PERYLENE	z 4,000	: ND

TO = NOT OFFICED

NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614012

:

DATE: 6-14-88

ATTN: BOB VANTUYL

QAS SAMPLE #: 80419003

DATE RECEIVED: 4-19-88

SAMFLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH2, 8" - 38", SOIL SAMPLE

DATE EXTRACTED:

DATE SAMPLED:

DATE ANALYZED: 6-7-88

METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL LOW PREP

PARAMETER	DET. LIMIT : ug/Kg	
PHENOL		
BIS(2-CHLOROETHYL)ETHER	: 1,000	: ND
2-CHLOROPHENOL	: 1,000	: ND
1,3 DICHLOROBENZENE	: 1,000	
1,4 DICHLOROBENZENE	: 1,000	
BENZYL ALCOHOL	: 1,000	
	: 1,000	: ND
1,2 DICHLOROBENZENE	: 1,000 : 1,000 : 1,000	: ND
2 METHYLPHENOL	: 1,000	: ND
BIS(2-CHLOROISOPROPYL)ETHER	: 1,000	: ND
4 METHYLFHENOL	: 1,000	
N-NITROSO-DI-N-PROPYLAMINE	: 1,000	
HEXACHLOROETHANE	: 1,000	
NITROBENZENE	: 1,000	: ND
ISOPHORONE	: 1,000	
2 NITROPHENOL	: 1,000	: ND
2,4 DIMETHYLPHENOL	: 1,000	: ND
BENZOIC ACID	: 5,000	: ND
BIS(2-CHLOROETHOXY)METHANE	: 1,000	: ND
2,4 DICHLOROPHENOL	: 1.000	: ND
1,2,4 TRICHLOROBENZENE	: 1,000	: ND
NAPHTHALENE	: 1,000	: ND : ND
4 CHLOROANILINE	: 1,000	: ND
HEXACHLOROBUTADIENE	: 1,000	
4 CHLORO-3-METHYLPHENOL	: 1,000	
2 METHYLNAPHTHALENE	1.000	• ND
HEXACHLOROCYCLOPENTADIENE	: 1,000	: ND
2,4,6 TRICHLOROPHENOL	: 1.000	: ND
2,4,5 TRICHLOROPHENOL	: 5,000	: ND
2 CHLORONAPHTHALENE	1,000	
DETERTED	/)	

OT DETECTED NOT APPLICABLE

Quality Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614012

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: :		DATE: 6-14-88	
FARAMETER	DET. LIMIT		
	: ug/Kg 	: ug/kg	
2 NITROANILINE	: 5,000	: ND	,
DIMETHYLPHTHALATE	: 5,000 : 1,000 : 1,000	: ND	· J
ACENAPHTHYLENE	: 1,000	: ND	
2,6 DINITROTOLUENE	: 1,000	: ND	
3 NITROANILINE	: 5,000	: ND	
ACENAPHTHENE	: 1,000	: ND	
2,4 DINITROPHENOL	: 5,000	: ND	
4 NITROPHENOL	: 5,000		
DIBENZOFURAN	: 1,000	: ND	
2,4 DINITROTOLUENE	: 1,000	: ND	
DIETHYLFHTHALATE	: 1,000	: ND	
4 CHLOROPHENYLPHENYLETHER	: 1,000	: ND	
FLUORENE	: 1,000		
4 NITROANILINE	: 5,000		
4,6 DINITRO-2-METHYLFHENOL	: 5,000		
N-NITROSODIPHENYLAMINE	: 1,000		
4 BROMOPHENYLPHENYLETHER	: 1,000		
HEXACHLOROBENZENE	: 1,000	: ND	
PENTACHLOROPHENOL	: 5,000	: ND	
PHENATHRENE	: 1,000		
ANTHRACENE	: 1,000	: ND	
DI-N-BUTYLPHTHALATE	: 1,000	: ND	
FLUORANTHENE	: 1,000	: ND	
PYRENE	: 1,000	: ND	
BUTYLBENZYLFHTHALATE	: 1,000	: ND	
3,3' DICHLOROBENZIDINE	: 2,000	: ND	
BENZO (A) ANTHRACENE	: 1,000	: ND	
CHRYSENE	: 1,000	: ND	
BIS(2-ETHYLHEXYL)PHTHALATE	: 1,000	: ND	
DI-N-OCTYLFHTHALATE	: 1,000	: ND	
BENZO(B)FLUORANTHENE	: 1,000	: ND	
BENZO (K) FLUORANTHENE	: 1,000	: ND	
BENZO (A) FYRENE	: 1,000	: ND	
INDENO(1,2,3-CD)PYRENE	: 1,000	: ND	
DIBENZ(A,H)ANTHRACENE	: 1,000	: ND	
BENZO(G,H,I)PERYLENE	: 1,000	: ND	
DETECTED			
APPLICABLE	$1 \sim 1 \sim$) //	
1 11 1 has de half ("Idah haarban	VIII (101) () ()	121/-	

D = NOT DETECTED OT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614005

DATE: 6-14-88

ATTN: BOB VANTUYL

QAS SAMPLE #: 80419004

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: 842, 38"-68" SOIL SAMPLE

DATE EXTRACTED:

DATE ANALYZED: 6-7-88

METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL MEDIUM PREP

PARAMETER	DET. LIMIT : ug\Kg	CONC : ug\Kg
PHENOL	: 4,000	: ND
BIS(2-CHLOROETHYL)ETHER	: 4,000	,
2-CHLOROPHENOL	: 4,000	: ND
1,3 DICHLOROBENZENE	: 4,000	: ND
1,4 CICHLOROBENZENE	: 4,000	: ND
BENZYL ALCOHOL	* 4,000	i ND
1.2 DICHLOROBENZENE	4,000	a ND
2 METHYLPHENOL	4,000	: ND
BIS(2-CHLOROISOPROPYL)ETHER	: 4,000	: ND
4 METHYLPHENOL	: 4,000	: ND
N-NITROSO-DI-N-PROPYLAMINE	: 4,000	: ND
HEXACHLOROETHANE	: 4,000	i ND
NITROBENZENE	: 4,000	: ND
ISOPHORONE	: 4,000	: ND
2 NITROPHENOL	. 000 : 4,000	a ND
Control of the Contro	a military	n 1944
2,4 DIMETHYLPHENOL	4 4,000	: ND
PENZOIC ACID	: 20,000	: ND
BIS(2-CHLOROSTHOXY)METHANE	: 4,000	: ND
2,4 DICHLOROPHENOL	: 4,000	; ND
1,2,4 TRICHLOROBENZENE	: 4,000	a ND
NAPHTHALENE	: 4,000	
4 CHLOROANILINE	: 4,000	
HEXACHLOROBUTADIENE	: 4,000	: ND
4 CHLORO-3-METHYLPHENOL	: 4,000	# ND
2 METHYLNAPHTHALENE	: 4,000	: ND
HEXACHLOROCYCLOPENTADIENE	: 4,000	i NΩ
2,4,6 TRICHLOROPHENOL	: 4,000 : 4,000	: ND
2,4,5 TRICHLOROPHENOL	. 4,000 <u>←</u> 20,000	: ND
2 CHLORONAFHTHALENE		: MD
And the same value of the same that the same same same same same same same sam	(; ·), 000	1 1945
)FTECTED		1

Rússall D. Modčy

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614005

PAGE 2

DATE: 6-14-68

	DET. LIMIT : ug\Kg	CONC. : ug\Kg·
2 NITROANILINE	: 20,000	: ND
DIMETHYLPHTHALATE	: 4,000	: ND
ACENAPHTHYLENE	: 4,000	: ND
2,6 DINITROTOLUENE	: 4,000	s ND
3 NITROANILIME	: 20,000	: ND
ACENAPHTHENE	: 4,000	: ND
2,4 DINITROPHENOL	: 20,000	: ND
4 NITROPHENOL	: 20,000	: ND
DIBENZOFURAN	: 4,000	: ND
2,4 DINITROTOLUENE	: 4,000	: ND
DIETHYLPHTHALATE	: 4,000	; ND
4 CHLOROPHENYLPHENYLSTHER	: 4,000	a ND
FLUORENE	: 4,000	: ND
4 MITROAMILINE	; 20.000	i ND
4,5 DINITRO-2-METHYLPHENOL	: 20,000	: ND
N-NITROSODIPHENYLAMINE	: 4,000	: MD
4 BROMOPHENYLPHENYLETHER	: 4,000	: ND
HEXACHLOROBENZENE	: 4,000	: ND
PENTACHLOROPHENOL	: 20,000	a ND
PHENATHRENE	: 4,000	a ND
ANTHRACENE	: 4,000	: ND
OI-M-BUTYLPHTHALATE	a 4,000	s ND
FLUORANTHENE	: 4,000	: ND
PYRENE	: 4,000	: ND
BUTYLBENZYLPHTHALATE	: 4,000	: ND
3.31 DICHLOROBENZIDINE	: 8,000	s ND
PENZO(A)ANTHRACENE	: 4,00	: ND
CHRYSENE	: 4,000	: ND
BIS(2-ETHYLHEXYL)PHTHALATE	: 4,000	: ND
DI-N-OCTYLPHTHALATE	: 4,000	s ND
BENZC(B)FLUORANTHENE	: 4,000	: ND
BENZO(K)FLUORANTHENE	: 4,000	: ND
BENZO(A)PYRENE	4,000	: ND
INDENO(1,2,3-CD)PYRENE	: 4,000	; ND
DIBENZ(A,H)ANTHRACENE	: 4,000	: ND
BENIO(G,H,I)PERYLENE	. 4,000	: ND

P = NOT DETECTED A = NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614006

DATE: 6-14-88

ATTN: BOB VANTUYL

QAS SAMPLE #: 80419005

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH2, 68"-74" SOIL SAMPLE

DATE EXTRACTED:

DATE ANALYZED: 6-7-88

METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL MEDIUM PREP

PARAMETER	DET. LIMIT : ug\Kg	# 10	conc ug/k	
PHENOL	: 4,000	·———	ND	
BIS(2-CHLOROETHYL)ETHER	: 4,000	_	ND	\checkmark
2-CHLOROPHENOL	: 4,000		ND	
1-3 OICHLOROBENZEME	4,000		ND	
1,4 DICHLOROBENIENE	: 4,000		ND	
BENZYL ALCOHOL	4,000		ND	٠.
1,2 DICHLOROBENZENE	4,000		ND	
2 METHYLPHENOL	: 4,000		ND	
BIS(2-CHLOROISOPROPYL)ETHER	: 4,000	_	ND	
4 METHYLPHENOL	: 4,000	-	ND	
N-NITROSO-DI-N-PROPYLAMINE	: 4,000		ND	
HEXACHLOROETHANE	3 4.000		ND	
NITROBENZENE	: 4,000		ND	
ISORHORONE	i 4,000		MΩ	
3 NITROPHENOL	: 4,000	_	ND	
2,4 DIMETHYLPHENOL	: 4. 000	7	MD	
BENZOIC ACID	: 20,000		ND	
BIS(2-CHLOROETHOXY)METHANE	: 4.000		MD	
2,4 DICHLOROFHENOL	: 4,000	ī.	ND	
1,2,4 TRICHLOROBENZENE	: 4,000	=	ND	
NAPHTHALENE	: 4,000	ŧ	ND	
4 CHLOROANILINE	: 4,000	i	ND	
HEXACHLOROBUTADIENE	: 4,000	7	ND	
4 CHLORO-3-METHYLPHENOL	: 4,000		ND	
2 METHYLNAPHTHALENE	: 4,000	=	ND	
HEXACHLOROCYCLOPENTADIENE	: 4,000	1	СM	
2,4,6 TRICHLOROPHENOL	: 4,000	7	ND	
2,4,5 TRICHLOROPHENOL		:		
2 CHLORONAPHTHALENE	4,000		ND	

p = Not detected a > Not applicable

Russell D. Accdy

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614006

PAGE 2

DATE: 6-14-88

		,,
PARAMETER	DET. LIMIT	CONC.
	: ug\Kg	: ug\Kg
2 NITROANILINE	: 20,000	: NID /
DIMETHYLPHTHALATE	: 4,000	: ND
ACENAPHTHYLEME	: 4,000	; ND
2,6 DINITROTOLUENE	: 4,000	: ND
3 NITROANILINE	: 20,000	: ND
ACENAPHTHENE	: 4,000	: ND
2,4 DINITROPHENOL	: 20,000	: ND
4 NITROPHENOL	: 20,000	: ND
DIBENZOFURAN	: 4,000	: ND
2,4 DINITROTOLUENE	: 4,000	: ND
DIETHYLPHTHALATE	: 4,000	: ND
4 CHLOROPHENYLPHENYLETHER	: 4,000	a ND
FLUCRENC	: 4,000	e ND
4 NITROANILINE	: 20,000	s ND
4,6 DIMITRO 2 METRIMUPHENOL	: 20,000	i MD
N-NXTROSODIPHENYLAMINE	: 4,000	: ND
4 BROMOPHENYLPHENYLETHER	: 4,000	: ND
HEXACHLORGBENZENE	: 4,000	: ND
PENTACHLOROPHENOL	: 20,000	: ND
PHENATHRENE	s 4,000	: ND
ANTHRACENE	: 4,000	: ND
DI-M-BUTYLPHTHALATE	: 4,000	: ND
FILLIDRANTHENE	: 4,000	: ND
PYRENE	: 4,000	: NO
BUTYLBENZYLPHTHALATE	: 4,000	a MD
3,3' DICHLOROBENZIDIME	: 2,000	a ND
BENZO(A)ANTHRACENE	: 4,000	
CHRYGEME	: 4,000	: ND
BIS(2-ETHYLHEXYL)PHTHALATE	: 4,000	: ND
DI-N-OCTYLPHTHALATE	: 4,000	: ND
PENZO(P)FLUGRANTHENE	: 4,000	: ND
BENZO(K)FLUORANTHENE	: 4,000	: ND
PENZO(A)PYRENE	: 4,000	: ND
INDENO(1,2,3-CD)PYREME	: 4,000	: ND
DIBENZ(A,H)ANTHRACENE	<u>;</u> 4,000	: ND
BENIC(G,H,I)PERYLENE	4,000	: ND
DETROYED	1 1 1 1 1 1 1	7 1
WPLICABLE		/ //

D = NCT DETECTED A = NCT APPLICABLE

Russell D. Moccy

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614007

DATE: 6-14-88

ATTN: BOS VANTUYL

QAS SAMPLE #: 80419006

DATE RECEIVED: 4-19-88

DATE SAMPLED: SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH3, O"-15" SOIL SAMPLE

DATE EXTRACTED: DATE ANALYZED: 6-7-68
METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL MEDIUM PREP

PARAMETER	DET. LIMIT : ug\Kg	:	can ug/	
PHENOL	: 4,000		 ND	/
BIS(2-CHLOROETHYL)ETHER	•	5		1/
2-CHLOROPHENOL	: 4,000	# 2	ND	
1,3 DICHLOROBENZENE	: 4,000	-	MD	
1,4 DICHLOROBENZENE	: 4,000	3 L	MD	
PENZYL ALCOHOL	: 4,000	5	ND	
1,2 DICHLOROBENZENS	: 4,000	=	MD	
2 METHYLPHENOL	4,00	=	ND	
BIS(2-CHLOROISOPROPYL)ETHER	: 4,000	2	ND	
4 METHYLPHENOL	: 4,000		ND	
N-NITROSO-DI-N-PROPYLAMINE	: 4,000	K B	ND	
HEXACHLOROETHANE	1 4,000	#	ND	
MITROBENZENE	: 4,000	:	ND	
ISOPHORONE	: 4.000	3	ND	
2 NITROPHENOL	: 4,000	Ţ.	ND	
2,4 DIMETHYLPHENOL	: 4,000	ī	NΩ	
BENZOIC ACID	: 20,000	:	ND	
BIS(2-CHLORCETHCXY)METHANE	: 4,000	<u>.</u>	ND	
2,4 DICHLORGPHENOL	: 4,000	3	ND	
1,2,4 TRICHLOROSENZENE	: 4,000	ī	MD	
NAPHTHALENE	: 4,000	= :	ND	
4 CHLOROANILINE	: 4,000	7	ND	
HEXACHLOROBUTADIENE	: 4,000	, ,	ND	
4 CHLORO-3-METHYLPHENOL.	: 4,000		ND	
2 METHYLNAPHTHALENE	: 4,000		ND	
HEXACHLOROCYCLOPENTADIENE	: 4,000	:	ND	
2,4,6 TRICHLOROFHENOL	: 4,000	:	ND	
2,4,5 TRICHLOROPHENOL	20,000	3	ND	
2 CHLORONAPHTHALENE	/ : Ya, oo	:	ND	

E = MOT DETECTED NA 5 NOT APPLICABLE

Aussell D. Moddy

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614007

PAGE 2

DATE: 6-14-88

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PARAMETER	DET, LIMIT	C	ONC.	
	: ug\Kg	:	ug/l	<₫
2 NITROANILINE	. 20 000		h i m	
DIMETHYLPHTHALATE	: 20,000 : 4,000		ND	√
ACENAPHTHYLENE	: 4,000		ND	
2,6 DINITROTOLUENE	: 4,000		ND ND	
3 NITROANILINE	20,000		ND ND	
ACENAPHTHENE	2 4,000		ND	
2,4 DINITROPHENOL	: 20,000		ND	
4 NITROPHENOL	: 20,000		ND ND	
DIBENZOFURAN	: 4,000	_		
2,4 DINITROTOLUENE	: 4,000 : 4,000		ND ND	
DIETHYLPHTHALATE	: 4,000	_	MD	
4 CHLOROPHENYLPHENYLETHER	: 4,000 : 4,000		ND	
FLUGRENE	: 4,000 : 4,000			
4 MITROAMILINE	: 7,000		ND ND	
4,5 DINITRO-2-METHYLPHENOL	: 20,000		ND ND	
N-NITROSODIPHENYLAMINE	20,000 2 4,000	_	ND	
4 BROMOPHENYLPHENYLETHER	: 4,000		ND	
HEXACHLOROBENZENE	: 4,000		ND	
PENTACHLOROPHENOL	: 20,000	•	ND	
PHENATHRENE	: 4,000		ND	
ANTHRACENE	: 4,000		ND	
THE PARTITION OF THE PARTY OF T	1 4,000	-	1MIN	
DI-M-BUTYLPHTHALATE	: 4,000	7	MΩ	
FLUORANTHENE	: 4,000		ND	
PYRENE	: 4,000	5	ND	
BUTYLBENZYLPHTHALATE	: 4,000	=	ND	
J,J' DICHLOROBENZIDIME	: 9,000	·	ND	
BENZO(A)ANTHRACENE	: 4,000	:	ND	
CHRYSENE	s 4,000	ų,	ND	
BIS(2-ETHYLHEXYL)PHTHALATE	: 4,000	:	ND	
DI-N-OCTYLPHTHALATE	: 4,000		ND	
BENZO(B)FLUORANTHENE	: 4,000		ND	
BENZO(K)FLUORANTHENE	: 4,000	•	ND	
BENZO(A)PYRENE	: 4,000	:	ND	
IMDENO(1,2,3-CD)PYRENE	: 4,000	77	ND	
DIBENZ(A,H)ANTHRACENE	2 4,000	I	ФИ	
BENZO(G,H,I)PERYLENE	: 4,000	2	ND	
•	/ \ ·			

'D = NOT DETECTED A = NOT APPLICABLE

Quality Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REFORT #: 80614008

DATE: 6-14-88

ATTN: BCB VANTUYL

QAS SAMPLE #: 80419007

DATE RECEIVED: 4-19-88

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH3, 15"-72" SOIL SAMPLE

DATE EXTRACTED:

DATE SAMPLED:

DATE ANALYZED: 6-7-88

METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL MEDIUM PREP

PARAMETER	DET. LIMIT : ug\Kg	CONC : ug/Kg
FHENOL	: 4,000	: ND
BIS(2-CHLOROETHYL)ETHER	: 41000	i ND
2-CHLOROPHENOL	: 4,000	: ND
1 3 DICHLOROPENZEME	. 4,000	t ND
1.0 DICHLOROBENZENE	: 4,000	: ND
BÉNZYL ALCOHOL	+ 4.000	: ND
1,2 DICHLORODENZEME	: 4,000	: ND
2 METHYLPHENOL	: 4,000	: ND
919(2-CHLOROISOPROPYL)ETHER	: 4,000	: ND
4 METHYLPHENOL	: 4,000	: ND
N-NITROSO-DI-N-PROPYLAMINE	: 4,000	: ND
HEXACHLOROETHANE	: 4,000	: ND
NITROBENZENE	: 4,000	: ND
ISOPHORONE	: 4,000	: ND
2 NITROPHENOL	: 4,000	a ND
2,4 DIMETHYLPHENOL	: 4,000	s ND
BENZOIC ACID	: 20,000	: ND
BIS(2-CHLORGETHCXY)METHANE	: 4,000	# ND
2,4 DICHLOROFHENOL	: 4,000	: ND
1,2,4 TRICHLOROBENZEME	: 4,000	s ND
NAPHTHALENE	: 4,000	: ND
4 CHLORDANILINE	: 4.000	s MD
HEXACHLOROSUTADIENE	: 4,000	: ND
4 CHLORO-3-METHYLPHENOL	: 4,000	: ND
2 METHYLNAPHTHALENE	: 4,000	: ND
HEXACHLOROCYCLOPENTADIENE	: 4,000	: ND
2,4,6 TRICHLOROPHENOL	: 4,000	: ND
2,4,5 TRICHLOROPHENOL	: 20,000	: ND
S CHLORONAPHTHALENE	4,000	: ND

Russell D. Maccy

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614008

PAGE 2

DATE: 6-14-88

PARAMETER	DET. LIMIT	CONC.		
	: ug\Kg	: ug\Kg		
2 NITROANILINE	: 20,000	s ND /		
DIMETHYLPHTHALATE	: 4.000	; ND		
ACENAPHTHYLENE	: 4,000	: ND		
2,6 DINITROTOLUENE	: 4,000	: ND		
3 NITROANILINE	: 20,000	a ND		
ACENAPHTHENE	: 4,000	: ND		
2,4 DINITROPHENOL	: 20,000	: ND		
4 NITROPHENOL	: 20,000	: ND		
DIBENZOFURAN	: 4,000	: ND		
2,4 DINITROTOLUEME	: 4.000	a ND		
DIETHYLPHTHALATE	: 4,000	: ND		
4 CHLOROPHENYLPHENYLETHER	: 4,000	: ND		
FLUORENE	: 4,000	: ND		
4 NITROANILINE	: 20,000	1 ND		
4,5 DINITRO-2-METHYLPHENOL	: 20,000	: ND		
N-NITEOSODIPHENYLAMINE	: 4,000	: ND		
4 BROMOPHENYLPHENYLETHER	: 4,000	: ND		
HEXACHLOROBENZENE	: 4,000	: ND		
PENTACHLORUPHENOL	: 20,000	s ND		
PHENATHRENE	: 4,000	s ND		
ANTHRACENE	: 4,000	: ND		
DI-N-BUTYLPHTHALATE	: 4,000	: ND		
FLUORANTHENE	: 4,000	a MD		
PYRENE	: 4,000	: ND		
BUTYLBENZYLPHTHALATE	: 4,000	: ND		
3,3' DICHLOROBENZIDINE	: 2,000	; ND		
BENZO(A)ANTHRACENE	: 4,000	: ND		
CHRYSENE	. 4,000	: ND		
BIS(2-ETHYLHEXYL)PHTHALATE	z 4,000	: ND		
DI-M-OCTYLPHTHALATE	: 4,000	: ND		
BENZO(B)FLUORANTHENE	: 4,000	: ND		
BENZO(K)FLUORÄNTHENE	: 4,000	: ND		
BENZO(A)PYRENE	: 4,000	an :		
INDENC(1,2,3-CD)PYRENE	: 4,000	; ND		
DIBENZ(A,H)ANTHRACENE	: 4,000	: ND		
BENZO(S,H,I)PERYLENS	: 4,000	: ND		

) = MOT DETECTED A = NOT APPLICABLE



SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614009

DATE: 6-14-88

ATTN: BOB VANTUYL

QAS SAMPLE #: 80419008

DATE RECEIVED: 4-19-88

DATE SAMPLED: SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH3, 6'-11' SOIL SAMPLE

DATE EXTRACTED:

DATE ANALYZED: 6-7-88

METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL MEDIUM PREP

PARAMETER	DET.LIMIT : ug\Kg	- CONC : ug/Kg
PHENOL	: 4,000	: ND /
BIS(2-CHLOROETHYL)ETHER	: 4,000	: ND
2-CHLOROPHENOL	: 4,000	: ND
1,3 DYCHLOROBENZEMO	: 4,000	; ND
1,4 DICHLOROBENZENE	: 4,000	: MD
RENZYL ALCOHOL	: 4,000	s ND
1,2 DICHLOROBENZEME	: 4,000	: ND
2 METHYLPHENOL	: 4,000	: ND
BIS(2-CHLOROISOPROPYL)ETHER	t A Chino	: NID
4 METHYLPHENOL	: 4,000	a ND
N-NITROSO-DI-N-PROPYLAMINE	: 4,000	: ND
HEXACHLOROETHANE	: 4,000	: ND
NITROBENZENE	: 4 <u>,</u> 000	t ND
ISOPHOROME	: 4,000	: ND
2 NITSCPHENOL	: 4,000	: ND
D.4 DIMETHYLPHENOL	: 4,000	; MO
PENZOIC ACID	: 20,000	: ND
BIS(2-CHLOROETHOXY)METHANE	: 4,000	t ND
2,4 CICHLOROPHENCL	: 4,000	: ND
1,2,4 TRICHLOROBENZENE	: 4,000	: ND
NAPHTHALENE	: 4,000	: ND
4 CHLOROANILINE	: 4,000	: ND
HEXACHLOROBUTADIENE	: 4,000	: ND
4 CHLORO-3-METHYLPHENOL	: 4,000	: ND
2 METHYLNAPHTHALENE .	: 4,000	; ND
HEXACHLOROCYCLOPENTADIENE	: 4,000	i ND
2,4,6 TRICHLOROPHENOL	: 4,000	: ND
2.4,5 TRICHLOROPHENOL	: 20,000	: NO
2 CHLOROMAPHTHALENE	; 4,500	: ND

A - NOT DETECTED VA - NOT APPLICABLE

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614009

PAGE 2

DATE: 6-14-88

PARAMETER	DET. LIMIT	C	CONC.
	: ug\Kg	:	ug\Kg
2 NITROANILINE	: 20,000		ND
DIMETHYLPHTHALATE	: 4,000		ND
ACENAPHTHYLENE	: 4,000		ND
2,6 DINITROTOLUENE	: 4,000		ND
3 NITROANILINE	: 20,000		ND
ACEMAPHTHENE	: 4,000		ND
2,4 DINITROPHENOL	: 20,000	=	ND
4 NITROPHENOL	: 20,000		ND
DIBENZOFURAN	: 4,000		ND
2,4 DINITROTOLUENE	: 4,000		ND
DÍETHYLPHTHALATE	: 4,000		ND
4 CHLOROPHEMYLPHENYLETHER	4,000		ND
FLUORENE	: 4,000		ND
4 NITROANILINE	: 20.000		ND
4,6 DINITRO 2-METHYLPHENOL	: 20,000		MD
N-MITROSODIPHENYLAMINE	: 4,000		MD
4 BROMOPHENYLPHENYLETHER	• 4 , 0000	_	ND
HEXACHLOROBENZENE	: 4,000		ND
PENTACHLOROPHENOL	: 20,000		ND
PHENATHRENE	: 4,000	n a	ND
ANTHRACENE	: 4,000		ND
DI-N-BUTYLPHTHALATE	: 4,000	<i>t</i>	ND
FLUGRANTHENE	: 4,000	Ē	MD
PYRENE	: 4,000	7	MΩ
BUTYLBENZYLPHTHALATE	: 4,000	P m	ND
3,31 DICHLOROBENZIDINE	: 8,000	4	MO
BENZO(A)ANTHRACENE	: 4,000	n *	ND
CHRYSENE	5 4,000		ND
8IS(2-ETHYLHEXYL)PHTHALATE	: 4,000		ND
DI-N-OCTYLPHTHALATE	: 4,000		MD
BENZO(B)FLUORANTHEME	: 4,000	1	ND
DENZO(K)FLUORANTHENE	: 4,000		ND
BENZO(A)PYRENE	: 4,000	* n	ND
INDEMO(1,2,3-CD)PYREME	: 4,000		ND
DIBENZ(A,H)ANTHRACENE	: 4,000		ND
BENZO(G,H,I)PERYLEME	: 4,000	4	MD

D = MOT DETECTED A = NOT ASSITEADE

Russell D. Moody

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614010

DATE: 6-14-88

ATTN: BOB VANTUYL

QAS SAMPLE #: 80419008 DUP

DATE RECEIVED: 4-19-88

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH3, 6'-11' SOIL SAMPLE

DATE EXTRACTED:

DATE SAMPLED:

DATE ANALYZED: 6-7-88

METHOD IDENT: SW 846-8270 SEMI VOLATILES IN SOIL MEDIUM PREP

PARAMETER	2	DET. LIMIT ug\Kg	3	CONC ug\K	9
PHENGL		4,000	 2 2	 ND	····· ···· ·
BIS(2-CHLOROETHYL)ETHER		4,000		ND	$\sqrt{}$
2-CHLOROPHENOL		4,000		ND	
L 3 OTCHLOROBENZENE		4,000	;	ND	
i a DICHLOROĐEMZENE	ŗ.	4,000	ŭ	NO	
REMZMI. OLCOHOL		4,000	t	MD	٠,
1,2 DICHLORODENZEME	:	4,000	:	ND	
S WELHAT SHEWOF		4,000	<u> </u>	MD	
BIS(2-CHLOROISOPROPYL)ETHER	<u>.</u>	4,000	.	ND	
4 METHYLPHENOL	ą	4,000	•	ND	
N-NITROSO-DI-N-PROPYLAMINE	5	4,000	3	ND	
HEXACHLOROETHANE	•	4,000	Ţ	מא	
NITROBENZENE	# #	4,000	.	ND	
ISOPHORONE	4	4,000	7. 2.	MD	
2 NITROPHENOL	ž.	4,000	Ę	ND	
2,4 DIMETHYLPHENOL	1	4,000	3	ND	
BENZOIC ACID	B	20,000	n u	ND	
91S(2-CHLOROETHGXY)METHANE	₹ 5	4,000	;	ND	
2,4 DICHLOROPHENOL	n n	4,000	* *	ND	
1,2,4 TRICHLOROBENZENE	\$	4,000	:	ND	
MAPHTHALENE	1	4,000		ND	
4 CHLOROANILINE	1	4,000	# #	ND	
HEXACHLOROBUTADIENE	2	4,000	2	ND	
4 CHLORO-3-METHYLPHENOL	1	4,000	:	ND	
2 METHYLNAPHTHALENS	ž.	4,000	2	ND	
HEXACHLGROCYCLOPENTADIENE	1	4,000	:	ИΩ	
2,4,6 TRICHLOROPHENOL	# =	4,000	:	ND	
2,4,5 TRICHLOROPHENOL	<u>u</u>	20,000	•	ND	
2 CHLOROMAPHTHALEME		4,000		ND	

= MOT DETECTED
(A = MOT APPLIONELE)

Suggall O. Mocay

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614010

PAGE 2

DATE: 6-14-88

PARAMETER .	DET. LIMIT	C	JONC.
•	: ug\Kg	:	ua/Kg
2 NITROANILINE	: 20.000	# T	ND
DIMETHYLPHTHALATE	: 4,000		ND
ACENAPHTHYLENE	: 4,000		ND
2,6 DINITROTOLUENE	: 4,000	1	ND
3 NITROAMILINE	: 20.000	:	ND
ACENAPHTHENE	: 4,000	n 3	ND
2,4 DINITROPHENOL	: 20,000	:	ND
4 NITROPHENOL	: 20,000	4	ND
DIBENZOFURAN	: 4,000	=	ND
2,4 DIMITROTOLUENE	* 4,000	=	ND
DIETHYLPHTHALATE	: 4,000	:	ND
4 CHLOROPHENYLPHENYLETHER	: 4,000	4	МD
FLUGRENE	: 4,000	ŧ	ND
4 NITEDANTLINE	: 20,000	<i>a</i> ::::	ND
4,5 DINITRO-2-METHYLPHENOL	: 20,000	3	ND
M-MITROSODIPHENYLAMINE	: 4,000	:	$M\Omega$
4 BROMOPHENYLPHENYLETHER	: 4,000	:	ND
HEXACHLOROBENZENE	4,000	=	ND
PENTACHLOROPHENOL	: 20,000	5	ND
PHEMATHRENE	: 4,000	:	МD
ANTHRACENE	: 4,000		ND
DI-N-BUTYLPHTHALATE	: 4,000	:: -	ND
FLUORANTHENE	: 4,000		ND
PYRENE	: 4,000	-	ND
BUTYLBENZYLPHTHALATE	: 4,000		ND
3,3° DICHLOROBENZIDIME	: 8,000		MD
BENZO (A) ANTHRACENE	: 4,000		ND
CHRYSENE	: 4,000	:	מא
BIS(2-ETHYLHEXYL)PHTHALATE	: 4,000	:	MD
DI-N-OCTYLPHTHALATE	: 4,000	•	ΝD
BENZO(B)FLUCRANTHENE	: 4,000		ND
BENZO(K)FLUORANTHENE	: 4,000	3	ИD
BENZO(A) PYRENE	: 4,000		ND
INDENO(1,2,3-CD)PYRENE	: 4,000		ND
DIBENZ(A,H)ANTHRACENE	: 4,000	3	ND
BENZO(G,H,I)PERYLENE	; 4,000	1	MD

)D = NOT DETECTED An = NOT APPLICABL

Russell D. Moody

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614010

DATE: 6-14-88

ATTN: BOB VANTUYL

GAS SAMPLE #: 80419009

DATE RECEIVED: 4-19-88

DATE SAMPLED: SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: BH3, 16'-17', SOIL SAMPLE

DATE EXTRACTED:

DATE ANALYZED: 6-8-88

METHOD IDENT:

PARAMETER	DET. LIMIT : ug\Kg	3	CONC ug\Kg
PHENOL	: 4,000		ND ,
BIS(2-CHLOROETHYL)ETHER	: 4,000		ND /
2-CHLOROPHENOL	: 4,000		ND
1 J OICHLOROBENZENE	: 4,000		MD
1,4 DICHLOROBENZENE	: 4,000		ND
SENZYL ALCOHOL	•	± .	· · · -
1,2 DICHLOROBENZENE	: 4,000		ND
2 METHYLPHEMOL	: 4,000		ND
BIS(2-CHLOROISOPROPYL)ETHER	4,000		ND
4 METHYLPHENOL	: 4,000	3	ND
N-MITROSO-DI-N-PROPYLAMINE	: 4,000	2	ND
HEXACHLOROETHANE	: 4,000		ND
NITROBENZENE	4,000		ND
ISOPHORONE	: 4,000		ND
2 NITROPHENOL	£ 4,000		ND
2,4 DIMETHYLPHENOL	: 4,000	2	ND
BÉNZOIC ACID	: 2Ó,000	# u	MD
BIS(2-CHLGROETHOXY)METHANE	± 4,000	?	ND
2,4 DICHLOROPHENOL	: 4,000		ND
1,2,4 TRICHLOROBENZENE	4,000	7	ND
NAPHTHALENE	: 4,000	7	ND
4 CHLOROANILINE	: 4,000	i	ND
HEXACHLOROBUTADIENE	: 4,000	ŗ	ND
4 CHLORO-3-METHYLPHEMOL	4 4,000	2	ND
2 METHYLNAPHTHALENE	: 4,000	:	ND
HEXACHLOROCYCLOPENTADIENE	: 4,000	;	ND
2,4,6 TRICHLORUPHENOL	· ·	#	
2,4.5 TRICHLOROPHENOL	•	7	
2 CHLOROMAPHTHALENE	/ :)-, ôso	n k	ND

D = NOT DETECTED WA JE NOT APPLICABLE

Quality Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80614011

PAGE 2

DATE: 6-14-88

		······································		
PARAMETER	DET. LIMIT	CONC.		
	: ug\Kg	: ug\Kg		
2 NITROANILINE	: 20,000	: ND		
DIMETHYLPHTHALATE	: 4,000	: ND 🗸		
ACENAPHTHYLENE	: 4,000	: ND		
2,6 DINITROTOLUENE	: 4,000	: ND		
3 NITROANILINE	: 20,000	* ND		
ACENAPHTHENE	: 4,000	: ND		
2,4 DINITROPHENOL	: 20,000	: ND		
4 NITROPHENOL	: 20,000	: ND		
DIBENZOFURAN	: 4,000	: ND		
2,4 DIMITROTOLUEME	: 4,000	: ND		
DIETHYLPHTHALATE	. : 4,000	: ND		
4 CHLOROPHENYLPHENYLETHER	: 4,000	s ND		
FLUCRENE	: 4,000	: ND		
4 NITROANILINE	: 20,000	: ND		
4,6 DIMITRO-2-METHYLPHENOL	: 20,000	s MD		
M-NITEOSODIPHENYLAMINE	: 4,000	3 MD		
4 BROMOPHENYLPHENYLETHER	± 4,000	: ND		
HEXACHLOROBENZENE	: 4,000	: ND		
PENTACHLOROPHENOL	: 20,000	: ND		
PHENATHRENE	: 4,000	: ND		
ANTHRACENE .	: 4,000	# ND		
DI -N-GUTYLPHTHALATE	: 4,000	: ND		
FLUORANTHENE	: 4,000			
PYRCHE	: 4,000	s ND		
BUTYLBENZYLPHTHALATE	: 4,000	± ND		
3,J1 DICHLOROBENZIDINE	: 8,000	: an		
DENIO(A)ANTHRACENE	: 4,000	: ND		
CHRYSENE	: 4,000	: ND		
BIS(2-ETHYLHEXYL)PHTHALATE	: 4,000	: ND		
DI-N-CCTYLPHTHALATE	: 4,000	: ND		
BENZO(B)FLUORANTHENE	: 4,000	: ND		
BENZO(K)FLUORANTHENE	: 4,000	: ND		
SENZO(A)PYRENE	: 4,000	: ND		
INDENO(1,2,3-CD)PYRENE	: 4,000	: MD		
DIBENZ(A,H)ANTHRACENE	: 4,000	: ND		
BEMZC(G,H,I)PERYLEME	. 4,000	: ND		
	/)			

"D = NOT OTTECTED > = NOT APPLICABLE

Russall D. Moody

Quality Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND

REPORT #: 80630003

DATE: 6-30-88

ATTN: ROBERT VANTUYL

QAS #: 80417003 DATE RECEIVED: 4-17-88

DATE SAMPLED: SAMPLED BY:

SAMPLE INFORMATION: RADIUM, BH2, 8 - 38", SOIL SAMPLE

SUMMARY OF ADDITIONAL ORGANIC CONSTITUENTS IN APPENDIX VIII

PARAMETER	METHOD	DET. LIMI ug/Kg	TS CONC.	
ACETONITE!! E	SW844-8270	: 1000	: ND	
ACETONITRILE ACETOPHENONE ACETYL CHLORIDE ACROLEIN ACRYLAMIDE	SW846-8270	: 5000	: ND	
ACETYL CHLORIDE	SW846-8240	: 100	: ND	
ACROLEIN	SW846-8240	: 100	: ND	
ACRYLAMIDE	SW846-8240	: 100	: ND	
ACRYLONITRILE	SW846-8240	: 200	: ND	٠.
ALLYL ALCOHOL	SW846-8240	: 100	: ND	
ALLYL CHLORIDE 4-AMINOBIPHENYL	SW846-8246	: 100	: ND	
4-AMINOBIPHENYL	SW846-8270 *	: 5000	: ND .	
4-AMINOFYRIDINE	SW846-8270	: 1000	: ND	
ANILINE	SW846-8270	: 1000	: ND : ND	
BENZAL CHLORIDE	SW846-8270	: 1000	: ND	
BENZIDINE	SW846-8270	: 1000	: ND : ND : ND	
BENZYL CHLORIDE	SW846-8270	: 1000	: ND	
BENZOTRICHLORIDE	SW846-8270	: 1000	: ND	
BIS(CHLOROMETHYL)ETHER	SW846-8270 SW846-8240	: 1000	: ND	
BROMOACETONE	SW846-8240	: 200	: ND	
CHLORAL	SW846-8270 SW846-8270 SW846-8270	: 1000	: ND	
CHLOROACETALDEHYDE	SW846-8270	: 1000	: ND	
1-CHLORONAF THALENE	SW846-8270	: 1000	: ND	
2-CHLOROETHYLVINYLETHER				
CHLOROMETHYLMETHYLETHER				
2-CHLORO-1,3-BUTADIENE	SW846-8270	: 1000	: ND	
3-CHLOROPROPIONITRILE	SW846-8270	: 1000	: ND	
CROTONALDEHYDE		: 1000	: ND	
1,2-DIBROMO-3-CHLOROPROP				
	SW846-8240	: 100	: ND : ND : ND	
1,4-DICHLORO-2-BUTENE	SW846-8240	: 100	: ND	
DICHLORODIFLUOROMETHANE	SW846-8240	: 100	: ND	
DICHLOROPHENYLARSINE	SW846-8270	: 5000	: ND	
1,2,3,4-DIEPOXYBUTANE				
	SW846-8270			
1,2-DIETHYLHYDRAZINE	SW846-8270	: 1000	: ND	

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SERVICE TO: DEFENBAUGH IND

REPORT #: 80630003

ATTN: ROBERT VANTUYL

DATE: 6-30-88

SUMMARY OF ADDITIONAL ORGANIC CONSTITUENTS IN AFFENDIX VIII (CONT.)

PARAMETERS	METHOD	I	ET. LIMITS	;	CONC. ug/Kg	
7,12-DIMETHYLBENZ(A)ANTH	RACENE					
	SW846-8270	=			ND	
1,1-DIMETHYLHYDRAZINE	SW846-8270	:	1000		ND	
1,2-DIMETHYLHYDRAZINE			1000	:	ND	
P-DIMETHYLAMINOAZOBENZEN		=	1000	:	ND	
A,A-DIMETHYLPHENETHYLAMII	NE					
	SW846-8270	:	1000	:	ND	
3,3'-DIMETHYLBENZIDINE	SW846-8270		1000		ND	
DIPHENYLAMINE	SW846-8270	:	1000		ND	
1,2-DIPHENYLHYDRAZINE	SW846-8270	:	1000	:	ND	
DIBENZ(A,H)ACRIDINE	SW846-8270	2	1000	:	ND	
DIBENZ(A,J)ACRIDINE	SW846-8270	:	1000	:	ND	
DI-N-PROPYLNITOSAMINE	SW846-8270	:	1000	:	ND	
1,4-DIOXANE	SW846-8270	:	1000	:	ND	
ETHYLENE DIBROMIDE	SW846-8240	:	200	:	ND	,
ETHYLENE DICHLORIDE	SW846-8240	:	100	:	ND	
2-ETHOXYETHANOL	SW846-8270	:	1000	:	ND	
ETHYLENEIMINE	SW846-8270		1000	:	ND	
EHTLYENE OXIDE	SW846-8270	:	1000	:	ND	
ETHYL METHANSULFONATE	SW846-8270	:	2000	:	ND	
FORMALEDHYDE	SW846-8270	:	1000	:	ND	
GLYCIDYALDEHYDE	SW846-8270	:	2000	:	ND	
HYDRAZINE	SW845-8270	:	1000	:	ND	
HEXACHLOROPHENE	SW846-8270	:	1000	:	ИD	
HEXACHLOROPROPENE	SW846-8270	:	1000	:	ND	
ISOBUTYL ALCOHOL	SW846-8240		100	:	ND	
	SW846-8270		2000	;	ND	
METHAPYRILENE	SW846-8270		1000	:	ND	
3-METHYLCHOLANTHRENE	SW846-8270		1000	2	ND	
METHYLENE BROMIDE	SW846-8240		100	:		
METHYL HYDRIZINE	SW846-8270		1000	:	ND	
METHYL IODIDE	SW846-8240	:	200	:	ND	
2-METHYLLACTONITRILE	SW846-8270	:	2000	:	ND	
METHYL METHACRYLATE	SW846-8270		1000	:	ND	
METHYL METHANSULFONATE	SW846-8270	:	2000	:	ND	
METHYL PARATHIAN	SW846-8270	:	5000	:	ND	
1-NAPTHYLAMINE	SW846-8270	:	1000	:	ND	
2-NAFTHYLAMINE	SW846-8270	:	1000	:	ND	
VICOTINE	SW846-8270	:	5000	:	ND	
2-NITROPROPANE	SW846-8240	:	100	:	ND	



PAGE 3

SERVICE TO: DEFFENBAUGH IND

REPORT #: 80630003

ATTN: ROBERT VANTUYL

DATE: 6-30-88

SUMMARY OF ADDITIONAL ORGANIC CONSTITUENTS IN AFFENDIX VIII (CONT.)

ARAMETERS	METHOD	Di	ET. LIMI	rs	C	CONC.	
·			ug/Kg 			ug/Kg 	·
-NITROSO-DI-N-BUTYLAMINE	SW846-8270		2000		ND		
-NITROSODIETHANOLAMINE	SW846-8270		1000		ND		•
-NITROSODIETHYLAMINE	SW846-8270		1000		ND		
-NITROSODIMETHYLAMINE	SW846-8270		1000		ND		
-NITROSOMETHYLETHYLAMINE			1000		ND		•
-NITROSFIPERIDINE	SW846-8270		1000		ND		
ITROSOPYRROLIDINE	SW846-8270		1000		ND		
ARALDEHYDE	SW846-8270		2000				
ARATHION	SW846-8270		5000				
ENTACHLOROBENZENE	SW846-8270		5000	_	ND		
ENTACHLOROETHANE	SW846-8270		1000		ND		
	SW846-8270		5000		ND		
HENACETIN	SW846-8270		1000		ND		
HENYLENEDIAMINE	SW846-8270		2000		ND		
HOSGENE HOSGENE	SW846-8240		2000		ND		
HOSPHINE	SW846-8240		200		ND		
-PICOLINE					ND		
	SW846-8270		1000				
	SW846-8270		1000		ND		
	SW846-8270		1000		ND .	• •	
	SW846-8270		1000		ND		
YRIDINE	SW846-8270	:	1000	:	ND		
, 2, 4,5-TETRACHLOROBENZENE							
	SW846-8270		2000		ND		
,3,7,8-TCDD	SW846-8270		5000		ND		
,1,1,2-TETRACHLOROETHANE			100		ND		
,3,4,6-TETRACHLOROPHENOL			5000		ND		
ETRANITROMETHANE	SW846-8270		1000		ND		
HIOACETAMIDE	SW846-8270		2000		ND		
HIOMETHANOL	SW846-8240		200	*	ND		
HIOPHENOL	SW846-8270	:	2000				
OLUENEDIAMINE	SW846-8270	:	1000		ND		
,4-TOLUENEDIAMINE	SW846-8270	:	1000		ND		
,6-TOLUENEDIAMINE	SW846-8270	:	1000	:	ND		
-TOLUIDINE	SW846-8270	:	1000	:	ND		
-TOLUIDINE HYDROCHLORIDE	SW846-8270	:	1000	2	ND		
RICHLOROMETHANETHIOL	SW846-8240	:	200	\supset :	ND		
RICHLOROFLUOROMETHANE	SW846-8240	:	100/):	ND		
,2,3-TRICHLOROPROPANE	SW846-8240		100	/:	ND		

Quality Analytical Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 80621008

DATE: 6-21-88

ATTN: ROBERT VANTUYL

QAS SAMPLE #: 80419003

DATE RECEIVED: 4-19-88

DATE SAMPLED:

SAMPLED BY: BOB VANTUYL

SAMPLE INFORMATION: RADIUM, BH2, 8-38", SOIL SAMPLE

PARAMETER	EXTRACTION / ANALYSIS METHODS	DET. LIMIT mg/Kg	CONC. mg/Kg
ALLIMITATION			
[*] ALUMINUM	CLF-M EXHIBIT D/200.7	14	: 22,200
	CLP-M EXHIBIT D/204.2		. ND
ARSENIC	CLP-M EXHIBIT D/206.2	0.4	: 15.3 🔨
	CLP-M EXHIBIT D/200.7		: 310 🗸
	CLF-M EXHIBIT D/200.7		: ND
BORON	CLP-M EXHIBIT D/200.7	5.0	: ND
CADMIUM	CLF-M EXHIBIT D/200.7		: 3.0
	CLP-M EXHIBIT D/200.7		: 4270
	CLF-M EXHIBIT D/200.7		: 13.5
COBALT	CLP-M EXHIBIT D/200.7	3.1	: 8.0
	CLP-M EXHIBIT D/200.7		
IRON	CLP-M EXHIBIT D/200.7	6.4	: 19,400
LEAD	CLP-M EXHIBIT D/239.2	0.3	: 16.5
MAGNESIUM	CLP-M EXHIBIT D/200.7	45	: 3740
MANGANESE	CLP-M EXHIBIT D/200.7	0.3	: 507
MERCURY	CLP-M EXHIBIT D/245.5	0.2	: ND
NICKEL	CLP-M EXHIBIT D/200.7	1.9	: ND
POTASSIUM	CLP-M EXHIBIT D/200.7	100	: 1640
SELENIUM	CLP-M EXHIBIT D/270.2		: ND
	CLP-M EXHIBIT D/200.7	3.B	: ND
SODIUM	CLF-M EXHIBIT D/200.7	500	: ND
THALLIUM	CLP-M EXHIBIT D/279.2		: ND
VANADIUM	CLP-M EXHIBIT D/200.7	1.0	: 35.9
ZINC	CLP-M EXHIBIT D/200.7		: 53

ND = NONE DETECTED (BELOW DETECTION LIMITS)

RUSSELL D. MOODY

APPENDIX A-10

MONITORING WELL ANALYTICAL RESULTS

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 7110505

DATE: 11-05-87

ATTN: Robert Vantuyl

QAS SAMPLE #: 70427004

SAMPLE ID: Well #2 Radium Petroleum

	PARAMETER	METHOD	DET. LIMIT	CONC.
	рН	9040	NA NA	6.63
	Cyanides	9010	0.1 mg/l	ND
	Flash Point	1010	NA	> 195 F
_	Total Metals			
	Arsenic	6010	0.05 mg/l	0.05 mg/l
	Antimony	6010	0.06 mg/l	ND
	Barium	6010	0.01 mg/l	0.6 mg/l
	Beryllium	6010	0.005 mg/l	ND
	Cadmium	6010	0.01 mg/l	ND
	Chromium	6010	0.010 mg/l	0.020 mg/l
	Copper	6010	0.025 $mg/1$	ND
	Lead	6010	0.05 mg/l	0.4 mg/l
	Mercury	7470	0.0002 mg/l	ND
	Nickel	6010	0.02 mg/l	ND
	Selenium	6010	0.08 mg/l	ND
	Silver	5010	0.02 mg/l	ND
	Thallium	6010	0.10 mg/l	ND
	Zinc	6010	0.010 mg/l	0.1 mg/l

Kelly Gipson

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Deffenbaugh Industries

REPORT #: 7110505

p. #2

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427004

SAMPLE ID: Well #2 Radium Petroleum

VOLATILES METHOD 624 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
Chloromethane	2.3	ND
Bromomethane	3.1	ND
Vinyl Chloride	3.8	23.1
Chloroethane	4.6	ND
Methylene Chloride	2.8	34.2
Trichlorofluoromethane	4.2	ND
1,1-dichloroethene	2.8	12.2
1-Dichloroethane	4.7	8.5
1,2-Dichloroethene	1.6	ND
Chloroform	1.6	ND
1,2-Dichloroethane	2.8	ND
1,1,1-Trichloroethane	3.8	5.4
Carbon Tetrachloride	2.8	ND
Bromodichloromethane	2.2	ND
1,1,2,2-Tetrachloroethane	6.9	8.9
1,2-Díchloropropane	6.0	ND
cis 1,3-Dichloropropene	5.0	ND
Trichloroethene	1.7	12.5
Dibromochloromethane	<u> </u>	ND
1,1,2-Trichloroethane	5.0	ND
Benzene .	4.4	56.3
trans 1,3-Dichloropropene	3.6	ND
Bromoform	4.7	ND
Tetrachloroethene	4.1	ND
Toluene	3.1	98 . 5
Chlorobenzene	3.1	ND
Ethyl Benzene	2.6	ND
Bis(chloromethyl)ether	7.1	ND
Acrolein	8.3	ND
Acrylonitrile	7.5	ND
2-Chloroethylvinyl ether	6.4	ND

O. Kelly Gipsor

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110505

p.#3

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427004

SAMPLE ID: Well #2 Radium Petroleum

SEMI-VOLATILES METHOD 625 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
phenol	3.0	ND
bis (2-chloroethyl)ether	10.0	ND
2-chlorophenol	6.6	ND
1,3-dichlorobenzene	3.8	ND
1,4-dichlorobenzene	8.8	ND
Benzyl Alcohol	10.0	ND
1,2-Dichlorobenzene	3.8	ДИ
2-Methylphenol	10.0	ND
bis (2-chloroisopropyl)ether	10.0	ND
4-Methylphenol	10.0	ND
N-nitroso-di-n-propylamine	10.0	ND
Hexachloroethane	3 . 8	ND
Ni trobenzene	3.8	ND
Isophorone	4.4	ND
2-Nitrophenol	7.2	ИD
2,4-Dimethylphenol	3.0	ND
Benzoic Acid	50	ND
bis (2-chloroethoxy) methane	10.Q	ND
2,4-Dichlorophenol	5.4	ND
1,2,4-Trichlorobenzene	3.8	ND
Naphthalene	3.2	ND
4-chloroaniline	10.0	ND
Hexachlorobutadiene	1.8	ПИ
4-chloro-3-methylphenol	ద.0	ND
2-Methylnaphthalene	10.0	ND
Hexachlorocyclopentadiene	10.0	ND
2,4,6-Trichlorophenol	5.4	ND
2,4,5-Trichlorophenol	50	ND
2-Chloronaphthalene	3 . 8	ND
2-Nitroaniline	50	ND
Dimethyl Fhthalate	3.2	ND
Acenaphthylene	7.0	ND
2,6-dinitrotoluene	3.8	ND

O. Kelly Gipson

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110505

p.#3

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427004

SAMPLE ID: Well #2 Radium Fetroleum

SEMI-VOLATILES METHOD 625 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
phenol	3.0	ND
bis (2-chloroethyl)ether	10.0	ND
2-chlorophenol	6.6	ND
1,3-dichlorobenzene	3.8	ND
1,4-dichlorobenzene	8.8	ND
Benzyl Alcohol	10.0	ND
1,2-Dichlorobenzene	3.8	ND

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REPORT #: 7110505

QAS SAMPLE #: 70427004

(ug/l)	•	•
COMPOUND	DET. LIMIT	CONC.
3-Nitroaniline	50	ND
Acenaphthene	3.8	ND
2,4-Dinitrophenol	8.4	ND
4-nitrophenol	4.8	QN
Dibenzofuran	10.0	ND
2,4-Dinitrotoluene	8.4	ND
DiethylPhthalate	3.8	ND
4-chlorophenyl-phenyl ether	8.4	ND
Fluorene	3.8	ND
_4-Nitroaniline	50	ND
,6-dinitro-2-methy1phenol	48	ND
N-Nitrosodiphenylamine	3,8	ND
4-Bromophenyl-phenylether	3.8 ⁻	· ND
Hexachlorobenzene	1.9	ND
Pentachlorophenol	7.2	ND
Fhenanthrene	10.0	ND
Anthracene	3 . 8	ND
Di-n-butyl phthalate	5.0	ND
Fluoranthene	4.4	ND
Pyrene	3 . 8	ND
Buty1benzy1phthalate	5.0	, ND
3,3'-dichlorobenzidine	50	ND
Benzo(a)anthracene	10.0	ND
Chrysene ,	5.0	ND -
Bis (2-ethylhexyl)phthalate	5.0	ND
Di-N-octyl phthalate	9.6	ND
Benzo (b) fluoranthene	9.6	ПИ
Benzo (k) fluoranthene	5.0	ND
Benzo (a) pyrene	7.4	. ND
Indeno (1,2,3-cd) Pyrene	5.0	ПИ
Dibenz (a,h) anthracene	5.0	ND
Benzo (g,h,i,) perylene	8.2	ND

O. Kelly Gipson King Kelly Reffer

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110505

p. #5

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427004

SAMPLE ID: Well #2 Radium Petroleum

PESTICIDES/PCBS METHOD 8080 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
ALPHA - BHC	1.0	ND
BETA - BHC	1.0	ND
DELTA - BHC	1.0	ND
GAMMA - BHC	1.0	ND
HEPTACHLOR	1.0	ND
ALDRIN	1.0	ND
HEPTACHLOR EPOXIDE	1.0	ND
NDOSULFAN I	1.0	ND
DIELDRIN	1.0	ND
4,4°-DDE	1.0	ND
ENDRIN	1.0	ND
ENDOSULFAN II	1.0	ND
4 , 4 " -DDD	1.0	ND
ENDOSULFAN SULFATE	1.0	ND
4,4'-DDT	1.0	ND
ENDRIN KETONE	1.0	ND
ENDRIN ALDEHYDE	1.0	ND
CHLORDANE	5.0	ND
TOXAPHENE	5.0	ND
AROCHLOR - 1016	5.0	ND
AROCHLOR - 1221	5.0	ND
AROCHLOR - 1232	5.0	αи
AROCHLOR - 1242	5.0	ND
AROCHLOR - 1248	5.0	ND
AROCHLOR - 1254	5.0	ND
AROCHLOR - 1260	5.0	ND

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 7110506

DATE: 11-05-87

ATTN: Robert Vantuyl

QAS SAMPLE #: 70427005

SAMPLE ID: Well #3 Radium Petroleum

 PARAMETER	METHOD	DET. LIMIT	CONC.
 	, and dead took only space space space pass and make past or of pract took make taple took have seen		
рН	9040	NA	7.11
Cyanides	9010	0.1 mg/l	ND
Flash Point	1010	NA -	> 195 F
Total Metals			
Arsenic	6010	0.05 mg/l	0.14 mg/l
Antimony	6010	0.06 mg/l	ND
Barium	6010	0.01 mg/l	0.8 mg/l
Beryllium	6010	0.005 mg/l	ND
Cadmium	6010	0.01 mg/l	ND
Chromium	6010	0.010 mg/l	0.020 mg/l
Copper	6010	0.025 mg/l	ND
Lead	6010	0.05 mg/l	0.3 mg/l
Mercury	7470	0.0002 mg/l	ND
Nickel	6010	0.02 mg/l	ND
Selenium	6010	0.08 mg/l	ND
Silver	6010	0.02 თე/1	ND
Thallium	6010	0.10 mg/l	ND
Zinc	6010	0.010 mg/l	0.06 mg/l

Kelly Gipson_.

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110506

p. #2

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427005

SAMPLE ID: Well #3 Radium Fetroleum

VOLATILES METHOD 624 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
Chloromethane	2.3	ND
Bromomethane	3.1	ND
Vinyl Chloride	3.8	ND
Chloroethane	4.6	ΝD
Methylene Chloride	2.8	54.1
Trichlorofluoromethane	4.2	ND
_ 1,1-dichloroethene	2.8	11.0
1,1-Dichloroethane	4.7	9.0
1,2-Dichloroethene	1.6	ND
Chloroform	16	ND
1,2-Dichloroethane	2.8	ФИ
1,1,1-Trichloroethane	3.8	6.9
Carbon Tetrachloride	2.8	ND
Bromodichloromethane	2.2	ИD
1,1,2,2-Tetrachloroethane	6.9	ND
1,2-Dichloropropane	6.0	ND
cis 1,3-Dichloropropene	5.0	QN
Trichloroethene	19	6.1
Dibromochloromethane	3.1	ND
1,1,2-Trichloroethane	5.0	ND
Benzene ,	4.4	23.6
trans 1,3-Dichloropropene	3.6	ND
Bromoform	4.7	ND
Tetrachloroethene	4.1	ND
Toluene	3.1	78.5
Chlorobenzene	3.1	ND
Ethyl Benzene	2.6	ND
Bis(chloromethy1)ether	7.1	ND
Acrolein	8.3	ND
Acrylonitrile	7.5	ND
2-Chloroethylvinyl ether	6.4	αи

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110506

p.#3

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427005

SAMPLE ID: Well #3 Radium Fetroleum

SEMI-VOLATILES METHOD 625 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
phenol	3.0	ND
bis (2-chloroethyl)ether	10.0	ND
2-chlorophenol	ခုနှစ်	ND
1,3-dichlorobenzene	3. 8	ND
1,4-dichlorobenzene	e.	DN
Benzyl Alcohol	10.0	ND
,2-Dichlorobenzene	3.8	ФИ
2-Methylphenol	10.0	ND
bis (2-chloroisopropyl)ether	10.0	ND
4-Methylphenol	10.0	ND
N-nitroso-di-n-propylamine	10.0	ND
Hexachloroethane	3. 8	ND
Nitrobenzene	3. 8	ND
Isophorone	4.4	ПN
2-Nitrophenol	7.2	ND
2,4-Dimethylphenol	3 . 0	ND
Benzoic Acid	50	ND
bis (2-chloroethoxy) methane	10.0	ND
2.4-Dichlorophenol	5.4	ND
1,2,4-Trichlorobenzene	3.8	ND
Naphthalene	3.2	ND
4-chloroaniline	10.0	ND
Hexachlorobutadiene	1.8	ФИ
4-chloro-3-methylphenol	6. 0	ND
2-Methylnaphthalene	10.0	ND
Hexachlorocyclopentadiene	10.0	ND
2,4,6-Trichlorophenol	5.4	ПИ
2,4,5-Trichlorophenol	50	ND
2-Chloronaphthalene	J.8	ND
2-Nitroaniline	50	D
Dimethyl Phthalate	3.2	ND
Acenaphthylene	7.0	ďИ
2,6-dinitrotoluene	3.8 ₎	ND

O. Kelly Gipson

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REPORT #: 7110506 p. 4

QAS SAMPLE #: 70427005

(ug/1)

COMPOUND	DET. LIMIT	CONC.
3-Nitroaniline	50	ND
Acenaphthene	3.8	ND
2,4-Dinitrophenol	8.4	ND
4-nitrophenol	4.8	ND
Dibenzofuran	10.0	ND
2,4-Dinitrotoluene	8.4	ND
DiethylFhthalate	3.8	ND
4-chlorophenyl-phenyl ether	8.4	ND
Fluorene	3.8	ND
4-Nitroaniline	50	ND
,6-dinitro-2-methylphenol	48	αи
N-Nitrosodiphenylamine	3.8	ND
4-Bromophenyl-phenylether	3.B	ND
Hexachlorobenzene	1.9	ND
Pentachlorophenol	7.2	ND
Fhenanthrene	10.0	ND
Anthracene	3.8	ND
Di-n-butyl phthalate	5.0	ND
Fluoranthene	4.4	ПИ
Pyrene	3.8	ND
Butylbenzylphthalate	5.0	ND
3,3'-dichlorobenzidine	50	ND
Benzo(a)anthracene	10.0	ND
Chrysene	5.0	ND
Bis (2-ethylhexyl)phthalate	5.0	ND
Di-N-octyl phthalate	9.6	ND
Benzo (b) fluoranthene	9.6	ДИ
Benzo (k) fluoranthene	5.0	ND
Benzo (a) pyrene	7.4	. ND
Indeno (1,2,3-cd) Pyrene	5.0	ND
Dibenz (a,h) anthracene	5.0	ND
Benzo (g,h,i,) perylene	8.2	ND

O. Kelly Gipson July Relly deform

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110506

p. #5

ATTN: Bob Vantuyl

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QAS SAMPLE #: 70427005

SAMPLE ID: Well #3 Radium Petroleum

PESTICIDES/PCBS METHOD 8080 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
ALPHA — BHC	1.0	ND
BETA - BHC	1.0	ND
DELTA - BHC	1.0	ND
GAMMA - BHC	1.0	ND
HEFTACHLOR	1.0	ДИ
ALDRIN	1.0	ND
HEPTACHLOR EPOXIDE	1.0	ND
ENDOSULFAN I	1.0	ND
DIELDRIN	1.0	ND
4,4'-DDE	1.0	ND
ENDRIN	1.0	ND
ENDOSULFAN II	1.0	ND
4,4'-DDD	1.0	ND
ENDOSULFAN SULFATE	1.0	ND
4,4'-DDT	1.0	ND
ENDRIN KETONE	1 . O	ND
ENDRIN ALDEHYDE	1.0	ND
CHLORDANE	5.0	ND
TOXAPHENE	5.0	- ND
AROCHLOR - 1016	5.0	ND
AROCHLOR - 1221	5.0	ND
AROCHLOR - 1232	5.0	ND
AROCHLOR - 1242	5.0	ND
AROCHLOR - 1248	5.0	ND
AROCHLOR - 1254	5.0	ND
AROCHLOR - 1260	5.0	ND

O. Kelly Gipson Willy hylden

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 7110507

DATE: 11-05-87

ATTN: Robert Vantuyl

QAS SAMPLE #: 70427006

SAMPLE ID: Well #4 Radium Petroleum

 PARAMETER	METHOD	DET. LIMIT	CONC.
рН	9040	NA	6.31
Cyanides	9010	O.1 mg/l	ND -
Flash Point	1010	NA	> 195 F
Total Metals			
Arsenic	6010	0.05 mg/l	0.06 mg/l
Antimony	6010	0.06 mg/l	ND
Barium	6010	0.01 mg/l	1.7 mg/l
Beryllium	6010	0.005 mg/l	ND
Cadmium	6010	0.01 mg/l	ND
Chromium	6010	0.010 mg/l	0.020 mg/l
Copper	6010	0.025 mg/l	ND
Lead	6010	0.05 mg/l	0.3 mg/l
Mercury	7470	0.0002 mg/l	ND
Nickel	6010	0.02 mg/l	аи
Selenium	6010	0.08 mg/l	ND
Silver	6010	0.02 mg/l	ND
Thallium	6010	0.10 mg/l	ND
Zinc	6010	0.010 mg/l	0.18 mg/l

Kelly Gipson

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110507

p. #2

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427006

SAMPLE ID: Well #4 Radium Petroleum

VOLATILES METHOD 624 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
Chloromethane	2.3	ND
Bromomethane	3.1	ND
Vinyl Chloride	3.8	ND
Chloroethane	4.6	ND
Methylene Chloride	2.8	23.3
Trichlorofluoromethane	4.2	ND
_1,1-dichloroethene	2.8	15.5
t,1-Dichloroethane	4.7	8.7
1,2-Dichloroethene	1.6	ND
Chloroform	1.6	ND
1,2-Dichloroethane	2.8	ND
1,1,1-Trichloroethane	3.8	19.7
Carbon Tetrachloride	2.8	ND
Bromodichloromethane	2.2	ND
1,1,2,2-Tetrachloroethane	6.9	ND
1,2-Dichloropropane	6.0	ND
cis 1,3-Dichloropropene	5.0	ND
Trichloroethene	1.9	24.4
Dibromochloromethane	3.1	ND
1,1,2-Trichloroethane	5 . 0	ND
Benzene	4.4	65.2
trans 1,3-Dichloropropene	3.6	ND
Bromoform	4.7	ND
Tetrachloroethene	4.1	ND
Toluene	3. 1	132
Chlorobenzene	3.1	ND
Ethyl Benzene	2.6	ND
Bis(chloromethyl)ether	7.1	ND
Acrolein	8.3	ND
Acrylonitrile	7.5	ND
2-Chloroethylvinyl ether	6.4	ND

O. Kelly Gipson Clinkly Reflex

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110507

p.#3

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427006

SAMPLE ID: Well #4 Radium Petroleum

SEMI-VOLATILES METHOD 625 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
phenol	3.0	ND
bis (2-chloroethyl)ether	10.0	ПИ
2-chlorophenol	6.6	ND
1,3-dichlorobenzene	3.8	ND
1,4-dichlorobenzene	8.8	ND
Benzyl Alcohol	10.0	ND
1,2-Dichlorobenzene	3.8	ND
2-Methylphenol	10.0	ND
bis (2-chloroisopropyl)ether	10.0	ND
4-Methylphenol	10.0	ND
N-nitroso-di-n-propylamine	10.0	ND
Hexachloroethane	3.8	ND
Ni trobenzene	3 . 8	ND
Isophorone	4.4	ND
2-Nitrophenol	7.2	ND
2,4-Dimethylphenol	3.0	ND
Benzoic Acid	50	ND
bis (2-chloroethoxy) methane	10.0	ND
2,4-Dichlorophenol	5.4	ND
1,2,4-Trichlorobenzene	3.8	ND
Naphthalene	3.2	ND
4-chloroaniline	10.0	ДИ
Hexachlorobutadiene	1.8	ND
4-chloro-3-methylphenol	6.0	ФИ
2-Methylnaphthalene	10.0	ND
Hexachlorocyclopentadiene	10.0	ND
2,4,6-Trichlorophenol	5.4	ND
2,4,5-Trichlorophenol	50	ND
2-Chloronaphthalene	3 . 8	ND
2-Nitroaniline	50	ДИ
Dimethyl Phthalate	3,2	ND
Acenaphthylene	7.0	ND
2,6-dinitrotoluene	3.8	ND

O. Kelly Gipson Childle Suplay

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

REPORT #: 7110507

QAS SAMPLE #: 70427006

(ug/1)		
COMPOUND	DET. LIMIT	CONC.
3-Nitroaniline	50	αи
Acenaphthene	3 . 8	ND
2,4-Dinitrophenol	8.4	ND
4-nitrophenol	4.8	ND
Dibenzofuran	10.0	ND
2,4-Dinitrotoluene	8.4	ND
DiethylPhthalate	3.8	ND
4-chlorophenyl-phenyl ether	8.4	αи
Fluorene	3 . 8	ND
4-Nitroaniline	50	ND
6-dinitro-2-methylphenol	48	ND
W-Nitrosodiphenylamine	3.8	ND
4-Bromophenyl-phenylether	3 . 8	ND
Hexachlorobenzene	1.9	ND
Pentachlorophenol	7.2	ND
Finenanthrene	10.0	ND
Anthracene	3 . 8	ДИ
Di-n-butyl phthalate	5.0	ND
Fluoranthene	4.4	ND
Pyrene	3.8	ND
Butylbenzylphthalate	5.0	ND
3,3°-dichlorobenzidine	50	ND
Benzo(a)anthracene	10.0	ND
Chrysene ,	5.0	ND
Bis (2-ethylhexyl)phthalate	5.0	ND
Di-N-octyl phthalate	9.6	ND
Benzo (b) fluoranthene	9.6	ND
Benzo (k) fluoranthene	5.0	ND
Benzo (a) pyrene	7.4	ND
Indeno (1,2,3-cd) Pyrene	5.0	ND
Dibenz (a,h) anthracene	5.0	ND
Benzo (g,h,i,) perylene	8.2	ND

O. Kelly Gipson Cenkelly Kylson



SERVICE TO: Deffenbaugh Industries

REFORT #: 7110507

p. #5

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427006

SAMPLE ID: Well #4 Radium Petroleum

PESTICIDES/PCBS METHOD 8080 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
ALPHA — BHC	1.0	ND
BETA - BHC	1.0	ND
DELTA - BHC	1.0	ND
GAMMA — BHC	1 . O	ND
HEPTACHLOR	1.0	ND
ALDRIN	1.0	ПЛ
EPTACHLOR EPOXIDE	1.0	ND
ENDOSULFAN I	1.0	ND
DIELDRIN	1.0	ND
4,4°-DDE	1.0	ND
ENDRIN	1.0	ND
ENDOSULFAN II	1.0	ND
4,4°-DDD	1.0	ND
ENDOSULFAN SULFATE	1.0	ND
4,4'-DDT	1.0	ND
ENDRIN KETONE	i.O	ND
ENDRIN ALDEHYDE	1.0	ND
CHLORDANE:	5.0	ND
TOXAPHENE	5.0	ND
AROCHLOR - 1016	5.0	ND
AROCHLOR - 1221	5.0	ND
AROCHLOR - 1232	5.0	ND
AROCHLOR - 1242	5.0	ND
AROCHLOR - 1248	5.0	ND
AROCHLOR - 1254	5.0	ND
AROCHLOR - 1260	5.0	ND

3. Kelly Gipson July (1887)

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 7110508

DATE: 11-05-87

ATTN: Robert Vantuyl

QAS SAMPLE #: 70427007

SAMPLE ID: Well #5 Radium Petroleum

 PARAMETER	METHOD	DET. LIMIT	CONC.
ur Tott diese man sydd heles pens, sans, pens som nyns ynn, totol man pens, sans enler mer son		, alaa saay uuta ayad alaa saan alaa gaba alaa daga kala sakk sakk sakk sakk sakk sakk sak	
рН	9040	NA	6.53
Cyanides	9010	0.1 mg/l	ND
Flash Foint	1010	NA	> 195 F
Total Metals			
Arsenic	6010	0.05 mg/l	ND
Antimony	6010	0.06 mg/l	ND
Barium	6010	0.01 mg/l	1.1 mg/l
Beryllium	6010	0.005 mg/l	ND
Cadmium	6010	0.01 mg/l	ND
Chromium	6010	0.010 mg/l	0.020 mg/l
Copper	6010	0.025 mg/l	ND
Lead	6010	0.05 mg/l	0.4 mg/l
Mercury	7470	0.0002 mg/l	ND
Nickel	6010	0.02 mg/l	ND
Selenium	6010	0.08 mg/l	ND
Silver	6010	0.02 mg/l	ND
Thallium	6010	0.10 mg/l	ND
Zinc	6010	0.010 mg/l	0.32 mg/l

O. Kelly Gipson

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SERVICE TO: Deffenbaugh Industries

REPORT #: 7110508

p. #2

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427007

SAMPLE ID: Well #5 Radium Petroleum

VOLATILES METHOD 624 (ug/1)

COMFOUND	DET. LIMIT.	CONC.
Chloromethane	2.3	ND
Bromomethane	3.1	ND
Vinyl Chloride	3.8	23.1
Chloroethane	4.6	ND
Methylene Chloride	2.8	19.8
chlorofluoromethane	4.2	ND
	2.8	24.3
1,1-Dichloroethane	4.7	18.6
1,2-Dichloroethene	1.6	ND
Chloroform	1.6	MD
1,2-Dichloroethane	2.8	ND
1,1,1-Trichloroethane	3.8	19.0
Carbon Tetrachloride	2.8	ND
Bromodichloromethane	2.2	ND
1,1,2,2-Tetrachloroethane	6. 9	ND
1,2-Dichloropropane	6.0	ND
cis 1,3-Dichloropropene	5.0	ND
Trichloroethene	1.9	22.1
Dibromochloromethane	3.1	ND
1,1,2-Trichloroethane	5.0	, ND
Benzene ,	· 4 ₄ 4	64.9
trans 1,3-Dichloropropene	J. 6	ND
Bromoform	47	ND
Tetrachloroethene	4.1	ND
Toluene	3.1	119
Chlorobenzene	3.1	ND
Ethyl Benzene	2.6	ND
Bis(chloromethyl)ether	7.1	ДИ
Acrolein	8.3	ND
Acrylonitrile	7.5	ND
2-Chloroethylvinyl ether	5. 4	ND

O. Kelly Gipson Challes

Auality Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Deffenbaugh Industries

REPORT #: 7110508

p.#3

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427007

SAMPLE ID: Well #5 Radium Petroleum

SEMI-VOLATILES METHOD 625 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
phenol	3.0	ND
bis (2-chloroethyl)ether	10.0	ND
2-chlorophenol	6.6	MD
1 _z 3-dichlorobenzene	3.8	ND
-dichlorobenzene	8.8	ND
zyl Alcohol	10.0	ND
1,2-Dichlorobenzene	3 . 8	ND
2-Methylphenol	10.0	ND
bis (2-chloroisopropyl)ether	10.0	αи
4-Methylphenol	10.0	ПИ
N-nitroso-di-n-propylamine	10.0	ND
Hexachloroethane	3.8	ND
Nitrobenzene	3.8	ND
Isophorone	4.4	ПM
2-Ni trophenol	7.2	ND
2,4-Dimethylphenol	3.0	ND
Benzoic Acid	50	ND
bis (2-chloroethoxy) methane	10.0	ND
2,4-Dichlorophenol	5.4	ДИ
1,2,4-Trichlorobenzene	3 . 8	מא
Naphthalene	3.2	ND
4-chloroaniline	10.0	ПИ
Hexachlorobutadiene	1.8	ND
4-chloro-3-methylphenol	6. 0	ND
2-Methylnaphthalene	10.0	ND
Hexachlorocyclopentadiene	10.0	ND
2,4,6-Trichlorophenol	5.4	ND
2,4,5-Trichlorophenol	50_	ND
2-Chloronaphthalene	3.8	ND
2-Nitroaniline	<u>5</u> 0_	ND
ethyl Phthalate	3.2	ND
Alenaphthylene	7.0	ND
2,6-dinitrotoluene	3.8	ND

O. Kelly Gipson

Blenkilly Kyster

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

REPORT #: 7110508

p. 4

QAS SAMPLE #: 70427007

(ug/1)

, may may 7		•
COMPOUND	DET. LIMIT	CONC.
3-Nitroaniline	50	ND
Acenaphthene	3.8	ND
2,4-Dinitrophenol	8.4	ND
4-nitrophenol	4.8	ND
Dibenzofuran	10.0	ND
2,4-Dinitrotoluene	8.4	ND
DiethylPhthalate	3.8	ND
4-chlorophenyl-phenyl ether	8.4	ND
prene	3.8	ND
itroaniline	50	ND
4,6-dinitro-2-methylphenol	48	ND
N-Nitrosodiphenylamine	3.8	ND
4-Bromophenyl-phenylether	3 . 8	ND
Hexachlorobenzene	1.9	ND
Pentachlorophenol	7.2	ND
Phenanthrene	10.0	ND
Anthracene	3.8	D
Di-n-butyl phthalate	5.0	ND
Fluoranthene	4.4	ND
Pyrene	3.8	ND
Butylbenzylphthalate	5.0	ND
3,3'-dichlorobenzidine	50	ND
Benzo(a)anthracene	10.0	ND
Chrysene ,	5.0	ND
Bis (2-ethylhexyl)phthalate	5.0	DM
Di-N-octyl phthalate	9.6	ПN
Benzo (b) fluoranthene	9.6	ND
Benzo (k) fluoranthene	5.0	ND
Benzo (a) pyrene	7.4	ND
Indeno (1,2,3-cd) Pyrene	5.0	ND
Dibenz (a,h) anthracene	5.0	ND
Benzo (g,h,i,) perylene	8.2	ND

O. Kelly Gipson Millings



SERVICE TO: Deffenbaugh Industries

REPORT #: 7110508

p. #5

ATTN: Bob Vantuyl

QAS SAMPLE #: 70427007

SAMPLE ID: Well #5 Radium Petroleum

PESTICIDES/PCBS METHOD 8080 (ug/1)

COMPOUND	DET. LIMIT.	CONC.
ALFHA — BHC	1.0	ND
BETA - BHC	1.0	ND
DELTA — BHC	1.0	ND
GAMMA - BHC	1.0	ND
HEPTACHLOR	1.0	ND
RIN	1.0	DN
HEPTACHLOR EPOXIDE	1.0	ДИ
ENDOSULFAN I	1.0	ND
DIELDRIN	1.0	ND
4,4'-DDE	1.0	ND
ENDRIN	1.0	ND
ENDOSULFAN II	1.0	ND
4,4'-DDD	1.0	ND
ENDOSULFAN SULFATE	1.0	ND
4,4'-DDT	1.0	ND
ENDRIN KETONE	1.0	ND
ENDRIN ALDEHYDE	1.0	ND
CHLORDANE	5.0	ND
TOXAPHENE	5.0	ND
AROCHLOR - 1016	5.0	ND
AROCHLOR - 1221	5.0	ΩN
AROCHLOR - 1232	5.0	ND
AROCHLOR - 1242	5.0	ND
AROCHLOR - 1248	5.0	ND
AROCHLOR - 1254	5.0	ND
AROCHLOR - 1260	5.0	ND

O. Kelly Gipson

Menholy Kylson



SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-1

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001

DATE RECEIVED: 1-7-92

DATE SAMPLED: 1-7-92

SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

PARAMETER	METHOD	DET. LIMIT	CONC.
	;	: (mg/L)	: (mg/L)
Total Metals	:	:	:
Antimony	: EPA 200.7	: 0.06	: ND
Arsenic	: EPA 206.2	: 0.0047	: 0.832
Barium	: EPA 200.7	: 0.032	: 3.59
Beryllium	: EPA 200.7	: 0.001	: 0.004
Cadmium	: EPA 200.7	: 0.005	: ND
Chromium	: EPA 200.7	: 0.008	: 0.111
Copper	: EPA 200.7	: 0.009	: 0.482
Lead	: EPA 239.2	: 0.0032	: 0.732
Mercury	: EPA 245.1	: 0.0002	: ND
Nickel	: EPA 200.7	: 0.015	: 0.340
Selenium	: EPA 270.2	: 0.0022	: ND
Silver	: EPA 200.7	: 0.008	: ND
Thallium	: EPA 279.2	: 0.0037	: ND
Zinc	: EPA 200.7	: 0.008	: 2.02
	:	:	:
	:	:	:
	•	,	•

ND = NOT DETECTED NA = NOT APPLICABLE

Kevin L. Fillmore



SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-2

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001

DATE RECEIVED: 1-7-92

DATE SAMPLED: 1-7-92

SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

PARAMETER	METHOD	DET. LIMIT	CONC.
:	•	: (mg/L)	: (mg/L)
:	:	:	:
: Ammonia	: EPA 350.1	: 0.1	: 10.8
: Biochemical	: EPA 405.1	: 1.0	: 396
: Oxygen Demand	:	:	:
Chemical Oxygen	: EPA 410.4	: 5.0	: 1,210
Demand	:	:	:
Cyanide, Total	: EPA 335.2	: 0.01	: ND
: Oil & Grease	: EPA 413.1	: 0.2	: 193
: pH	: EPA 150.1	: NA	: 6.83
: Phenolics	: EPA 420.1	: 0.05	: 2.70
: Sulfide, Total	: EPA 376.2	: 0.1	: ND
: Total Organic	: EPA 415.1	: 0.05	: 252
: Carbon	:	:	:
: Total Petroleum	: EPA 418.1	: 10	: 135
: Hydrocarbons	:	:	:
: Total Suspended	: EPA 160.2	: 4.0	: 2,120
: Solids	:	:	:
:	:	:	:

ND = NOT DETECTED NA = NOT APPLICABLE

Kevin I. Fillmore

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-3

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001

DATE SAMPLED: 1-7-92

DATE RECEIVED: 1-7-92

SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

VOLATILE O	RGANIC CO	MPOUNDS	- EPA 62	4	
PARAMETER	DE	'. LIMIT	(ug/L)		CONC. (ug/L)
Benzene	: 250)		:	817
Bromodichloromethane	: 250	1		:	ND
Bromoform	: 250	}		:	ND
Bromomethane	: 500	į		:	ND
Carbon tetrachloride	: 250	J		:	ND
Chlorobenzene	: 250)		:	ND
Chloroethane	: 500	ŧ		:	ND
2-Chloroethylvinyl ether	: 500	t		:	ND
Chloroform	: 250	t		:	ND
Chloromethane	: 500	1		:	ND
Dibromochloromethane	: 250)		:	ND
1,2-Dichlorobenzene	: 250	j		:	ND
1,3-Dichlorobenzene	: 250	j		:	ND
1,4-Dichlorobenzene	: 250	J		:	ND
1,1-Dichloroethane	: 250)		:	ND
1,2-Dichloroethane	: 250			:	ND
1,1-Dichloroethene	: 250)		:	ND
trans-1,2-Dichloroethene	: 250	1		:	ND
1,2-Dichloropropane	: 250	i		:	ND
cis-1,3-Dichloropropene	: 250	1		:	ND
trans-1,3-Dichloropropene	: 250	Į.		:	ND
Ethyl benzene	: 250			:	297
Methylene chloride	: 250	1		:	ND
1,1,2,2-Tetrachloroethane	: 250	ı		:	ND
Tetrachloroethene	: 250	j		:	ND
Toluene	: 250	,		:	2,200
1,1,1-Trichloroethane	: 250	t		:	ND
1,1,2-Trichloroethane	: 250	t		:	ND
Trichloroethene	: 250			:	ND
Trichlorofluoromethane	: 500	i		:	ND
Vinyl chloride	: 500	1		:	ND

ND = NOT DETECTED
* TENATIVELY IDENTIFIED COMPOUND

Kevrn Fillmore

Kevin L. Fillmore

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-4

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001

DATE RECEIVED: 1-7-92

SAMPLED BY: B. C. Millett DATE SAMPLED: 1-7-92

SAMPLE IDENTIFICATION: Water - MW #4

SEMI-VOLATILE OR	GANIC COMPOUNDS - EPA	625		
PARAMETER	DET. LIMIT (ug/L)		CONC. (ug/L)	
Acenaphthene	10	:	ND	
Acenaphthylene	10	:	ND	
Anthracene	10	:	ND	
Benzo(a)anthracene	10	:	ND	
Benzo(b)fluoranthene	10	:	ND	
Benzo(k)fluoranthene	10	:	ND	
Benzo(a)pyrene	10	:	ND	
Benzo(ghi)perylene	10	:	ND	
Benzyl butyl phthalate	10	:	ND	
Bis(2-chloroethyl) ether	10	:	ND	
Bis(2-chloroethoxy) methane	10	:	ND	
Bis(2-ethylhexyl) phthalate	10	:	31.7	
Bis(2-chloroisopropyl) ether	10	:	10.1	
4-Bromophenyl phenyl ether	10	:	ND	
2-Chloronaphthalene	10	:	ND	
4-Chlorophenyl phenyl ether	10	:	ND	
Chrysene	10	:	ND	
Dibenzo(a,h)anthracene	- 10	:	ND	
Di-n-butylphthalate	10	:	ND	
1,3-Dichlorobenzene	10	:	ND	
1,2-Dichlorobenzene	10	:	ND	
1,4-Dichlorobenzene	10	:	ND	
3,3'-Dichlorobenzidine	20	:	ND	
Diethyl phthalate	10	:	ND	
Dimethyl phthalate	10	:	ND	
2,4-Dinitrotoluene	10	:	ND	

ND = NOT DETECTED * TENATIVELY IDENTIFIED COMPOUND

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20107001-4

: Kansas City, MO

DATE: 1-23-92

ATTN: Ken Brooks

- PAGE 2 -

SEMI-VOLATILE ORGANIC COMPOUNDS - EPA 625

PARAMETER	DET. LIMIT (ug/L)	CONC. (ug/L)
2,6-Dinitrotoluene	10	: ND
Di-n-octylphthalate	10	: ND
Fluoranthene	10	: ND
Fluorene	10	: ND
Hexachlorobenzene	10	: ND
Hexachlorobutadiene	10	: ND
Hexachloroethane	10	: 15.9
Indeno(1,2,3-cd)pyrene	10	: ND
Isophorone	10	: ND
Naphthalene	10	: 41.1
Nitrobenzene	10	: ND
N-Nitrosodi-n-propylamine	10	: ND
Phenanthrene	10	: ND
Pyrene	10	: ND
1,2,4-Trichlorobenzene	10	: ND
4-Chloro-3-methylphenol	20	: ND
2-Chlorophenol	10	: ND
2,4-Dichlorophenol	10	: ND
2,4-Dimethylphenol	10	: 55.0
2,4-Dinitrophenol	50	: ND
2-Methyl-4,6-dinitrophenol	50	: ND
2-Nitrophenol	10	: ND
4-Nitrophenol	50	: ND
Pentachlorophenol	50	: ND
Phenol	10	: 84.0
2,4,6-Trichlorophenol	10	: ND

ND = NOT DETECTED
* TENATIVELY IDENTIFIED COMPOUND

Kevin L. Fillmore

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

ration REPORT #: 20107001-5

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20107001

DATE RECEIVED: 1-7-92

DATE SAMPLED: 1-7-92

SAMPLED BY: B. C. Millett

SAMPLE IDENTIFICATION: Water - MW #4

PE	STICIDES AND PCBS - EPA 608	
PARAMETER	DET. LIMIT (ug/L)	CONC. (ug/L)
Aldrin	0.04	: ND
alpha-BHC	0.03	: ND
beta-BHC	0.06	: ND
delta-BHC	0.09	: ND
gamma-BHC	0.04	: ND
Chlordane	0.14	: ND
4,4´-DDD	0.11	: ND
4,4'-DDE	0.04	: ND
4,4'-DDT	0.12	: ND
Dieldrin	0.02	: ND
Endosulfan I	0.14	: ND
Endosulfan II	0.04	: ND
Endosulfan sulfate	0.66	: ND
Endrin	0.06	: ND
Endrin aldehyde	0.23	: ND
Heptachlor	0.03	: ND
Heptachlor epoxide	0.83	: ND
Toxaphene	2.40	: ND
PCB-1016	0.65	: ND
PCB-1221	0.65	: ND
PCB-1232	0.65	: ND
PCB-1242	0.65	: ND
PCB-1248	0.65	: ND
PCB-1254	1.30	: ND
PCB-1260	1.30	: 2.48

ND = NOT DETECTED

Kevin L. Fillmore



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20106003-1

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE RECEIVED: 1-6-92

DATE SAMPLED: 1-6-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

PARAMETER	METHOD	DET. LIMIT	CONC.
	;	: (mg/L)	: (mg/L)
Total Metals	:	:	:
Antimony	: EPA 200.7	: 0.06	: ND
Arsenic	: EPA 206.2	: 0.0047	: 5.39
Barium	: EPA 200.7	: 0.032	: 12.1
Beryllium	: EPA 200.7	: 0.001	: 0.018
Cadmium	: EPA 200.7	: 0.005	: 0.014
Chromium	: EPA 200.7	: 0.008	: 0.398
Copper	: EPA 200.7	: 0.009	: 2.17
Lead	: EPA 239.2	: 0.0032	: 9.62
Mercury	: EPA 245.1	: 0.0002	: ND
Nickel	: EPA 200.7	: 0.015	: 1.40
Selenium	: EPA 270.2	: 0.0022	: ND
Silver	: EPA 200.7	: 0.008	: ND
Thallium	: EPA 279.2	: 0.0037	: ND
Zinc	: EPA 200.7	: 0.008	: 8.42
	:	:	:
	:	:	:
	:	:	:
· ·			

ND = NOT DETECTED NA = NOT APPLICABLE

Kevin I. Fillmore



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation : 1633 South Marsh

REPORT #: 20106003-2

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE RECEIVED: 1-6-92

DATE SAMPLED: 1-6-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

PARAMETER	METHOD	DET. LIMIT	CONC.
:	;	: (mg/L)	: (mg/L)
:	:	:	:
: Ammonia	: EPA 350.1	: 0.1	: 2.30
: Biochemical	: EPA 405.1	: 1.0	: 130
: Oxygen Demand	:	:	:
Chemical Oxygen	: EPA 410.4	: 5.0	: 350
Demand	:	:	:
. Cyanide, Total	: EPA 335.2	: 0.01	: ND
: Oil & Grease	: EPA 413.1	: 0.2	: 1,310
: pH	: EPA 150.1	: NA	: 6.61
: Phenolics	: EPA 420.1	: 0.05	: 0.500
: Sulfide, Total	: EPA 376.2	: 0.1	: ND
: Total Organic	: EPA 415.1	: 0.05	: 122
: Carbon	:	· :	:
: Total Petroleum	: EPA 418.1	: 10	: 3,150
: Hydrocarbons	:	:	:
: Total Suspended	: EPA 160.2	: 4.0	: 1,250
: Solids	:	:	:
:	:	:	:

ND = NOT DETECTED NA = NOT APPLICABLE

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20106003-3

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE RECEIVED: 1-6-92

DATE SAMPLED: 1-6-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

VOLATILE ORGANIC COMPOUNDS - EPA 624					
F	PARAMETER		DET. LIMI'	r (ug/L)	CONC. (ug/L)
E	Benzene	:	250		: 402
E	Bromodichloromethane	:	250		: ND
E	Bromoform	:	250		: ND
E	Bromomethane	:	500		: ND
	Carbon tetrachloride	:	250		: ND
	Chlorobenzene	;	250		: ND
	Chloroethane	:	500		: ND
< 2	2-Chloroethylvinyl ether	:	500		: ND
	Chloroform	:	250		: ND
C	Chloromethane	:	500		: ND
Ι	bibromochloromethane		250		: ND
k 1	,2-Dichlorobenzene	:	250		: ND
k 1	.,3-Dichlorobenzene	:	250		: ND
< 1	.,2-Dichlorobenzene .,3-Dichlorobenzene .,4-Dichlorobenzene	:	250		: ND
1	,1-Dichloroethane	:	250		: ND
1	,2-Dichloroethane		250		: ND
	,1-Dichloroethene		250		: ND
t	rans-1,2-Dichloroethene	:	250	men e comment	: ND
1	.,2-Dichloropropane	:	250		: ND
C	ris-1,3-Dichloropropene rans-1,3-Dichloropropene	:	250		: ND
t	rans-1,3-Dichloropropene	:	250		: ND
E	Ethyl benzene	:	250		: 396
	lethylene chloride	:	250		: ND
	.,1,2,2-Tetrachloroethane				: ND
1	'etrachloroethene	:	250		: ND
Ί	'oluene	:	250		: 2,070
1	.,1,1-Trichloroethane	;	250		: ND
	.,1,2-Trichloroethane				: ND
	richloroethene	:			: ND
	richlorofluoromethane				: ND
	inyl chloride		500		: ND

ND = NOT DETECTED

* TENATIVELY IDENTIFIED COMPOUND

Kevin I. Fillmore



1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20106003-4

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003 DATE RECEIVED: 1-6-92

DATE SAMPLED: 1-6-92 SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

SEMI-VOLATILE ORG	GANIC COMPOUNDS - EPA	625		
PARAMETER	DET. LIMIT (ug/L)		CONC.	(ug/L)
Acenaphthene	10	:	23.4	
Acenaphthylene	10	:	ND	
Anthracene	10	:	11.3	
Benzo(a)anthracene	10	:	ND	
Benzo(b)fluoranthene	10	:	ND	
Benzo(k)fluoranthene	10	:	ND	
Benzo(a)pyrene	10	:	ND	
Benzo(ghi)perylene	10	:	ND	
Benzyl butyl phthalate	10	:	ND	
Bis(2-chloroethyl) ether	10	:	ND	
Bis(2-chloroethoxy) methane	10	:	ИD	
Bis(2-ethylhexyl) phthalate	10	:	27.3	
Bis(2-chloroisopropyl) ether	10	:	ND	
4-Bromophenyl phenyl ether	10	:	ND	
2-Chloronaphthalene	10	:	ND	
4-Chlorophenyl phenyl ether	10	:	ND	
Chrysene	10	:	ND	
Dibenzo(a,h)anthracene	10	• :	ND	
Di-n-butylphthalate	10	:	ND	
1,3-Dichlorobenzene	10	:	ND	
1,2-Dichlorobenzene	10	:	ND	
1,4-Dichlorobenzene	10	:	ND	
3,3'-Dichlorobenzidine	20	:	ND	
Diethyl phthalate	10	:	ND	
Dimethyl phthalate	10	:	ND	
2,4-Dinitrotoluene	10	:	ND	

ND = NOT DETECTED
* TENATIVELY IDENTIFIED COMPOUND

Kevin L. Fillmore

Analytical Services

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20106003-4

: Kansas City, MO

DATE: 1-23-92

ATTN: Ken Brooks

- PAGE 2 -

SEMI-VOLATILE ORGANIC COMPOUNDS - EPA 625

PARAMETER	DET. LIMIT (ug/L)	CONC. (ug/L)	-
2,6-Dinitrotoluene	10	: ND	
Di-n-octylphthalate	10	: ND	
Fluoranthene	10	: ND	
Fluorene	10	: 36.5	
Hexachlorobenzene	10	: ND	
Hexachlorobutadiene	10	: ND	
Mexachloroethane	10	: 46.9	
Indeno(1,2,3-cd)pyrene	10	: ND	
Isophorone	10	: ND	
Naphthalene	10	: 253	
Nitrobenzene	10	: ND	
N-Nitrosodi-n-propylamine	10	: ND	
Phenanthrene	10	: 122	
Pyrene	10	: ND	
1,2,4-Trichlorobenzene	10	: ND	
4-Chloro-3-methylphenol	20	: ND	
2-Chlorophenol	10	: ND	
2,4-Dichlorophenol	10	: ND	
2,4-Dimethylphenol	10	: 38.6	
2,4-Dinitrophenol	50	: ND	
2-Methyl-4,6-dinitrophenol	50	: ND	
2-Nitrophenol	10	: ND	
4-Nitrophenol	50	: ND	
Pentachlorophenol	50	: ND	
Phenol	10	: ND	
2,4,6-Trichlorophenol	10	: ND	

Kerry Fillmore

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: Industrial Service Corporation

REPORT #: 20106003-5

: 1633 South Marsh

: Kansas City, MO 64126

DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20106003

DATE SAMPLED: 1-6-92

DATE RECEIVED: 1-6-92

SAMPLED BY: Charles West

SAMPLE IDENTIFICATION: Water - MW #5

PESTI	CIDES AND PCBS - EPA 608	
PARAMETER	DET. LIMIT (ug/L)	CONC. (ug/L)
Aldrin	0.04	: ND
alpha-BHC	0.03	: ND
beta-BHC	0.06	: ND
delta-BHC	0.09	: ND
gamma-BHC	0.04	: ND
Chlordane	0.14	: ND
4,4´-DDD	0.11	: ND
4,4´-DDE	0.04	: ND
4,4'-DDT	0.12	: ND
Dieldrin	0.02	: ND
Endosulfan I	0.14	: ND
Endosulfan II	0.04	: ND
Endosulfan sulfate	0.66	: ND
Endrin	0.06	: ND
Endrin aldehyde	0.23	: ND
Heptachlor	0.03	: ND
Heptachlor epoxide	0.83	: ND
Toxaphene	2.40	: ND
PCB-1016	0.65	: ND
PCB-1221	0.65	: ND
PCB-1232	0.65	: ND
PCB-1242	0.65	: ND
PCB-1248	0.65	: ND
PCB-1254	1.30	: ND
PCB-1260	1.30	: ND



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SERVICE TO: Industrial Service Corporation

REPORT #: 20113002-1

: 1633 South Marsh

: Kansas City, MO 64126 DATE: 1-23-92

ATTN: Ken Brooks

QAS #: 20113002

DATE RECEIVED: 1-13-92

SAMPLED BY:

DATE SAMPLED: 1-6-92 SAMPLE IDENTIFICATION: Water - Trip Blank

PARAMETER	METHOD	DET. LIMIT	CONC.
	:	: (mg/L)	: (mg/L)
Total Metals	:	:	:
Antimony	: EPA 200.7	: 0.06	: ND
Arsenic	: EPA 206.2	: 0.0047	: ND
Barium	: EPA 200.7	: 0.032	: ND
Beryllium	: EPA 200.7	: 0.001	: ND
Cadmium	: EPA 200.7	: 0.005	: ND
Chromium	: EPA 200.7	: 0.008	: ND
Copper	: EPA 200.7	: 0.009	: ND
Lead	: EPA 239.2	: 0.0032	: ND
Mercury	: EPA 245.1	: 0.0002	: ND
Nickel	: EPA 200.7	: 0.015	: 0.022
Selenium	: EPA 270.2	: 0.0022	: ND
Silver	: EPA 200.7	: 0.008	: ND
Thallium	: EPA 279.2	: 0.0037	: ND
Zinc	: EPA 200.7	: 0.008	: ND
	:	:	:
	:	:	:
	:	:	:

ND = NOT DETECTED NA = NOT APPLICABLE

Quality Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012704

DATE: 88/01/27

-ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231004 DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, WATER.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC.
HALOGENS	MICROCOULEMETRIC D-84		
METALS - TOTAL	3010		
ARSENIC	200.7	0.0037 mg/L	: 0.0053 mg/L
BARIUM	200.7	0.08 mg/L	: 0.41 mg/L
CADMIUM	200.7	0.002 mg/L	: 0.013 mg/L
CALCIUM	200.7	0.77 mg/L	: 175 mg/L
CHROMIUM	200.7	0.007 mg/L	: 0.021 mg/L
IRON	200.7	0.064 mg/L	: 1.063 mg/L
LEAD	200.7	0.056 mg/L	: 0.11 mg/L
MERCURY	245.1	0.0003 mg/L	: ND
SELENIUM	200.7	0.004 mg/L	: ND
SILVER	200.7	0.020 mg/L	: ND

NA = NOT APPLICABLE ND = NOT DETECTED

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012713

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231004 DATE RECEIVED: 12/31/87

SAMPLE INFORMATION: TEST HOLE #2, WATER.

ANALYTICAL RESULTS

FARAMETER	METHOD	DET. LIMIT	CONC
PCBS	USEPACLP, EXHIBIT D		
AROCLOR-1016 AROCLOR-1221 AROCLOR-1232 AROCLOR-1242 AROCLOR-1248 AROCLOR-1254 AROCLOR-1260		0.5 ug/L 0.5 ug/L 0.5 ug/L 0.5 ug/L 0.5 ug/L 1.0 ug/L	: ND : ND : ND : ND : ND : ND : 24 ug/L

NA = NOT APPLICABLE ND = NOT DETECTED

analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012719

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231004

DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLED BY: KELLY, LOU, DWIGHT

SAMPLE INFORMATION: LIVERS, TEST HOLE #2, DATE ANALYZED: 01/06/88

PARAMETER	DET. LIMIT	CONC.
VOLATILES (METHOD 624)	as ann ann aith 1916 1916 1916 1916 1916 1916 1916 191	no plane more coppe comes prince oppos claims comes delles aprice unité creux delles unités
CHLOROMETHANE	10 ug/L	: ND
BROMOMETHANE	10 ug/L	: ND
VINYL CHLORIDE	10 ug/L	: ND
CLOROETHANE	10 ug/L	: ND
METHYLENE CHLORIDE	5 ug/L	: 22 ug/L
ACETONE	10 üg/L	: ND
CARBON DISULFIDE	5 ug/L	: ND
1,1-DICHLOROETHENE	5 ug/L	: ND
1,1-DICHLOROETHANE	5 ug/L	: 137 ug/L
1,2-DICHLOROETHENE	5 ug/L	: 180 ug/L
CHLOROFORM	5 ug/L	: ND
1,2-DICHLOROETHANE	5 ug/L	: ND
2-BUTANONE	10 ug/L	: ND
1,1,1-TRICHLOROETHANE	5 ug/L	: 18 ug/L
CARBON TETRACHLORIDE	5 ug/L	: ND

NOT DETECTED NOT APPLICABLE

Quality Services, Inc.

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SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012719

PAGE 2

DATE: 88/01/27

PARAMETER	DET. LIMIT	CONC.
VINYL ACETATE	10 ug/L	: ND '
BROMODICHLOROMETHANE	5 ug/L	: ND
1,2-DICHLOROPROPANE	5 ug/L	: ND
CIS-1,3-DICHLOROPROPENE	5 ug/L	: ND
TRICHLOROETHANE	5 ug/L	: ND
DIBROMOCHLOROMETHANE	5 ug/L	: ND
1,1,2-TRICHLOROETHANE	5 ug/L	: ND
BENZENE	5 ug/L	: 17 ug/L
TRANS-1,3-DICHLOROPROPENE	5 ug/L	: ND
BROMOFORM	5 ug/L	: ND
4-METHYL-2-PENTANONE	10 ug/L	: ND
2-HEXANONE	10 ug/L	: ND
TETRACHLOROETHENE	5 ug/L	: ND
1,1,2,2-TETRACHLOROETHANE	5 ug/L	: ND
TOLUENE	5 ug/L	: 6 ug/L
CHLOROBENZENE	5 ug/L	: ND
ETHYLBENZENE	5 ug/L	: ND
STYRENE	5 ug/L	: ND
TOTÁL XYLENES	5 ug/L	: 27 ug/L

NOT DETECTED

= NOT APPLICABLE

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-02687

SERVICE TO: DEFFENBAUGH IND. REPORT #: 0000501 DATE: 88/02/05 ATTN: DWIGHT BRINKLEY DATE RECEIVED: 12/31/87 QAS SAMPLE #: 71231004 DATE SAMPLED: SAMPLED BY: SAMPLE INFORMATION: LIVERS, TEST HOLE #2, WATER. PARAMETER DET. LIMIT CONC. ug/L SEMI-VOLATILES (METHOD 625) PHENOL 10 ug/L : ND BIS(2-CHLOROETHYL)ETHER 10 ug/L : ND 2-CHLOROPHENOL 10 ug/L : ND 1,3 DICHLOROBENZENE 10 ug/L : ND 1,4 DICHLOROBENZENE 10 ug/L : ND BENZYL ALCOHOL 10 ug/L : ND 1,2 DICHLOROBENZENE 10 ug/L : ND 2 METHYLPHENOL 10 ug/L : ND BIS (2-CHLOROISOPROPYL) ETHER 10 ug/L : ND 4 METHYLPHENOL 10 ug/L : ND N-NITROSO-DI-N-PROPYLAMINE 10 ug/L : ND HEXACHLOROETHANE 10 ug/L : ND NITROBENZENE 10 ug/L : ND ISOPHORONE 10 ug/L : ND 2 NITROPHENOL 10 ug/L : ND 2,4 DIMETHYLPHENOL 10 ug/L 1 : ND BENZOIC ACID 50 ug/L -- : ND BIS (2-CHLOROETHOXY) METHANE 10 ug/L a ND 2,4 DICHLOROPHENOL 10 ug/L : ND 1,2,4 TRICHLOROBENZENE 10 ug/L : ND NAPHTHALENE 10 ug/L : ND 4 CHLOROANILINE 10 ug/L : ND HEXACHLOROBUTADIENE 10 ug/L : ND 4 CHLORO-3-METHYLPHENOL : ND 10 ug/L 2 METHYLNAPHTHALENE : ND 10 ug/L HEXACHLOROCYCLOPENTADIENE 10 ug/L : ND 2,4,6 TRICHLOROPHENOL 10 ug/L # ND 2,4,5 TRICHLOROPHENOL 50-1197L : MD 2 CHLORONAPHTHALENE 10 ug/L

ND = NOT DETECTED NA = NOT APPLICABLE

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8020501

PAGE 2

DATE: 88/02/05

•	DHIL. GO/O2	700
PARAMETER	DET. LIMIT	CONC. ug/L
2 NITROANILINE DIMETHYLPHTHALATE ACENAPHTHYLENE		
DIMETHYLPHTHALATE	50 ug/L 10 ug/L 10 ug/L	: ND
ACENAPHTHYLENE	10 ua/L	: ND
2,6 DINITROTOLUENE 3 NITROANILINE ACENAPHTHENE 2,4 DINITROPHENOL 4 NITROPHENOL DIBENZOFURAN	10 ug/L	: ND
3 NITROANILINE	50 ug/L	: ND
ACENAPHTHENE	10 ug/L	: ND
2,4 DINITROPHENOL	50 ug/L	: ND
4 NITROPHENOL	50 ug/L	: ND
DIBENZOFURAN	10 ug/L	: ND
2,4 DINITROTOLUENE	10 ug/L	
DIETHYLPHTHALATE	10 ua/L	: ND
4 CHLOROPHENYLPHENYLETHER	10 uã/L	: ND
FLUORENE	10 ug/L	
4 NITROANILINE	50 /I	- ND
4,6 DINITRO-2-METHYLPHENOL	50 ua/L	: ND
N-NITROSODIPHENYLAMINE	10 ug/L	: ND
4 BROMOPHENYLPHENYLETHER		
HEXACHLOROBENZENE	10 ug/L	: ND
PENTACHLOROPHENOL	50 ua/L	: ND
PHENANTHRENE	10 uo/L	: ND
ANTHRACENE	10 ug/L	: ND
DI-N-BUTYLPHTHALATE	10 ug/L 10 ug/L 10 ug/L 10 ug/L 20 ug/L 10 ug/L 10 ug/L 10 ug/L	: ND
FLUORANTHENE	10 ug/L	a ND
PYRENE	10 ug/L	: ND
BUTYLBENZYLPHTHALATE	10 ug/L	: ND
3,3' DICHLOROBENZIDINE	20 ug/L	: ND
BENZO (A) ANTHRACENE	10 ug/L	: ND
CHRYSENE	10 ug/L	; ND
BIS(2-ETHYLHEXYL)PHTHALATE	10 ug/L	: ND
DI-N-OCTYLPHTHALATE	10 ug/L	: ND
BENZO(B) FLUORANTHENE	10 ug/L	s ND
BENZO(K) FLUORANTHENE	10 ug/L	: ND
BENZO (A) PYRENE	10 ug/L	: ND
INDENO(1,2,3-CD)PYRENE	10 ug/L	s ND
DIBENZ (A, H) ANTHRACENE	10 ug/L	: ND
BENZO(G, H, I) PERYLENE	10 mg/L	# 14D
TECTED		1, 10, 1
FO. 1		. , , , ,

NA = NOT APPLICABLE

Quality Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012707

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231007 DATE RECEIVED: 12/31/87

DATE SAMPLED:

SAMPLE INFORMATION: LIVERS, TEST HOLE #3, WATER.

ANALYTICAL RESULTS

PARAMETER	METHOD	DET. LIMIT	CONC.
HALOGENS	MICROCOULEMETRIC D-84	0.1 mg/L	: 0.54 mg/L
METALS - TOTAL	3010		
ARSENIC	200.7	0.0037 mg/L	: 0.0157 mg/L
BARIUM	200.7	0.08 mg/L	: 0.52 mg/L
CADMIUM	200.7	0.002 mg/L	: 0.005 mg/L
CALCIUM	200.7	0.77 mg/L	: 171 mg/L
CHROMIUM	200.7	0.007 mg/L	: 0.024 mg/L
IRON	200.7	0.0 5 4 mg/L	: 1.270 mg/i.
LEAD	200.7	0.056 mg/L	: 0.23 mg/L
MERCURY	245.1	0.0003 mg/L	: ND
SELENIUM	200.7	0.004 mg/L	: ND
SILVER	200.7	0.020 mg/L	# ND

' NA = NOT APPLICABLE ND = NOT DETECTED

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012714

:

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231007 DATE RECEIVED: 12/31/87

SAMPLE INFORMATION: TEST HOLE #3, WATER.

ANALYTICAL RESULTS

	PARAMETER	METHOD	DET. LIMIT	CONC	
					•
	PCBS	USEFACLP, EXHIBIT D			
)	AROCLOR-1016		0.5 ug/L	: ND	
	AROCLOR-1221		0.5 ug/L	: ND	
	AROCLOR-1232		0.5 ug/L	: ND	
	AROCLOR-1242		0.5 ug/L	: ND	
	AROCLOR-1248		0.5 ug/L	: ND	
	AROCLOR-1254		1.0 ug/L	: ND	
	AROCLOR-1260		1.0 ug/L	: 4.9 ug/L ·	

NA = NOT APPLICABLE ND = NOT DETECTED

analytical Dervices, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 25%-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #. 8012720

DATE: 88/01/27

ATTN: DWIGHT BRINKLEY

QAS SAMPLE #: 71231007 DATE RECUIVED: 12/31/87 DATE SAMPLED: SAMPLED BY: KELLY, LOU, DWIGHT SAMPLE INFORMATION: LIVERS, TEST HOLE #3, DATE ANALYZED: 01/06/88 WATER. PARAMETER DET. LIMIT CONC.

VOLATILES (METHOD 624)

CHLOROMETHANE BROMOMETHANE VINYL CHLORIDE CLOROETHANE METHYLENE CHLORIDE ACETONE CARBON DISULFIDE 1,1-DICHLOROETHENE 1,1-DICHLOROETHANE 1,2-DICHLOROETHENE CHLOROFORM 1,2-DICHLOROETHANE 2-BUTANONE 1,1,1-TRICHLOROETHANE	10 ug/L 10 ug/L 10 ug/L 10 ug/L 5 ug/L 5 ug/L 5 ug/L 5 ug/L 5 ug/L 5 ug/L 5 ug/L 5 ug/L	: ND : ND : ND : 254 ug/L : 27 ug/L : 56 ug/L : ND : ND : 76 ug/L : ND : 76 ug/L : ND : ND : 31 ug/L : ND : 91 ug/L
1,1,1-TRICHLOROETHANE CARBON TETRACHLORIDE	-	: 91 ug/L : ND

NOT DETECTED NOT APPLICABLE

Analytical Services, Inc.

1633 S. Marsh • Box 266426 • Kansas City, MO 64126 • (816) 254-5257

SERVICE TO: DEFFENBAUGH IND.

REPORT #: 8012720

PAGE 2

.

DATE: 88/01/27

	10 ug/L THANE 5 ug/L PANE 5 ug/L DPROPENE 5 ug/L THANE 5 ug/L	- ·
PARAMETER	DET. LIMIT	CONC.
VINYL ACETATE BROMODICHLOROMETHANE	-	: ND
1,2-01CHLOROPROPANE CIS-1,3-DICHLOROPROPENE TRICHLOROETHANE	5 ug/L .	: ND : ND : ND
DIBROMOCHLOROMETHANE 1,1,2-TRICHLOROETHANE BENZENE	5 ug/L 5 ug/L	: ND
TRANS-1,3-DICHLOROPROPENE BROMOFORM	5 ug/L 5 ug/L 5 ug/L	
4-METHYL-2-PENTANONE 2-HEXANONE TETRACHLOROETHENE	10 ug/L 10 ug/L 5 ug/L	
1,1,2,2-TETRACHLOROETHANE TOLUENE	5 ug/L 5 ug/L	: ND : 19 ug/L
CHLOROBENZENE ETHYLBENZENE STYRENE	5 ug/L 5 ug/L 5 ug/L	: 13 ug/L : 48 ug/L : ND
TOTAL XYLENES	5 ug/L .	: 345 ug/L

NOT DETECTED

= NOT APPLICABLE

APPENDIX A-11

GROUND WATER MONITORING WELL INSTALLATION PLAN

GROUND WATER MONITORING WELL INSTALLATION PLAN

Industrial Service Corporation Kansas City, Missouri

January 24, 1992

PREPARED BY:

DEFFENBAUGH INDUSTRIES, INC Shawnee, Kansas

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6.0	HEALTH AND SAFETY PLAN	12
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,	LIST OF TABLES	
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3-2	SAMPLE COLLECTION SUMMARY - GROUND WATER SAMP	LES
4-1	TENTATIVE SCHEDULE FOR SITE INVESTIGATION	
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PLATE	TITLE	

2-1

SITE PLAN

ISC-Kansas City Monitoring Well Work Plan January, 1992 Page 1

1.0 INTRODUCTION

This work plan has been prepared to provide a Scope of Work for the drilling and installation of ground water monitoring wells at the Industrial Service Corporation facility located at 1633 S. Marsh, Kansas City, Missouri.

This project will include drilling and installation of 5 monitoring wells, including one to evaluate potential for hydrocarbon migration into the bedrock beneath the east side of the facility, and four to monitor and characterize hydrocarbon contamination of alluvial terrace deposits lying beneath and west of the facility.

Soils will be sampled during drilling of borings for the wells to in order evaluate and characterize contamination of soils beneath the site.

2.0 SITE DESCRIPTION

2.1 FACILITY LOCATION

Industrial Service Corporation (ISC) is a Missouri Corporation with corporate headquarters based at 1633 South Marsh, Kansas City, Missouri 64126. ISC owns and operates a Resource Recovery and an interim status TSD storage facility located at 1633 South Marsh Avenue in Kansas City, Missouri 64126. A site map is shown on Plate 2-1.

2.2 CURRENT STATUS

The ISC facility is in an area that is zoned industrial. Areas bordering the facility include both residential and industrial properties. The USEPA ID Number for the facility is MOD073027609. The ISC facility is a bulk storage and processing facility of used oil and contains approximately 34 above ground storage tanks.

Used oil is the primary constituent stored on site along with lesser amounts of diesel, hydraulic and other miscellaneous oils. ISC does not handle PCB oils or any related products/by-products.

ISC is certified by the Missouri Department of Natural Resources (MDNR) as a resource recovery facility (RR-004). Industrial Service Corporation is a multi-state transporter, collector, processor and distributor of used oil. The types of companies ISC typically collects from are service stations, railroads, retail auto dealers, car dealers, tune-up and auto repair shops, transmission shops, farm implement companies, truck and car leasing companies, and other general business establishments.

The collected used oil is reprocessed and marketed to industrial and commercial users as a "Specification Used Fuel Oil" in accordance with the November 29, 1985 Federal Register entitled "Hazardous Waste Management System, Used Oil; Final Rule."

2.3 SITE HISTORY

The facility began its operation at 1633 South Marsh Avenue in 1958 as a used oil collection and processing facility dba Radium Petroleum. ISC acquired the site in Kansas City, Missouri in 1974 from the former owner (Mr. Sam Hewitt) who originally founded Radium Petroleum. It is believed that used oil reprocessing for recycling is the only activity that has occurred at the site.

2.4 SUMMARY OF PREVIOUS INVESTIGATIONS

Industrial Service Corporation (ISC) owns and operates a Resource and Recovery facility at 1633 South Marsh in Kansas City, Missouri. A Remedial Investigation Program was undertaken to determine the type and extent of petroleum contamination presently underground at the facility.

In June 1986, Ecology and Environment, Inc., an independent consulting firm, was contracted by USEPA to conduct a RCRA facility assessment to determine if there had been a release of hazardous waste or hazardous constituents from solid waste management units. As a result of this site investigation, it appears that a petroleum product had migrated into the ground west of the facility.

In October, 1986, nine monitoring wells were installed at the site by ISC to track fluid levels and to collect any petroleum product coming into the wells. Measurements were kept for a brief period after installation and then discontinued. Any data from the wells is inconclusive because of inadequacies in well design.

From subsequent correspondence with the USEPA and MDNR, it was decided that a Work Plan would be developed by ISC and approved by the USEPA and MDNR for remedial action alternatives at the site.

Further site investigations were conducted on December 31, 1987 and January 2, 1988, when ISC contracted Total Environmental Services and Technologies to drill seven soil borings on the property belonging to the Livers Bronze Company, 1608 Marsh, located immediately to the west and northwest of the ISC facility. The purpose for drilling the borings was to determine the extent of the contaminant plume from the tank farm area. Two borings (TH-2, TH-3) encountered hydrocarbon contamination at depths of approximately 23-26 feet below ground level.

On April 5-6, 1988, three borings were drilled, cored and sampled within the tank farm. The borings provided data concerning subsurface geology beneath the tank farm as well as an indication of the extent of soil contamination beneath the facility. Samples were analyzed for volatile organic compounds (VOCs), Pesticides/PCBs, and EP Toxicity metals. Seven VOCs, six Pesticides/PCBs, and four metals were found above detectable limits.

A preliminary assessment of existing site data has identified potential migration pathways at the site. Because of inadequate construction characteristics of the monitoring wells installed by ISC in 1986 (PVC-1, PVC-2, PVC-3, MW-1 through MW-6) these well bores and casings provide a direct vertical conduit for any near surface contamination or free product to enter the alluvial deposits beneath the site.

ISC-Kansas City Monitoring Well Work Plan January, 1992 Page 4

During January 1992, with approval and field oversight by MDNR, the old well casings were removed and the holes plugged and abandoned in accordance with USEPA guidelines.

3.0 SCOPE OF WORK

This work plan has been developed for Industrial Service Corporation (ISC), Kansas City, Missouri, by Deffenbaugh Industries and provides a Scope of Work for this project.

The purpose of this project is to drill and install a new ground water monitoring well network to replace the wells which were plugged and abandoned in January 1992. This plan will allow an assessment of hydrogeology and geology beneath the site and provide new data to assess the nature and extent of hydrocarbon contamination at the site.

3.1 SOIL BORING PROGRAM

3.1.1 Purpose

The purpose of the soil boring program is to provide data on geologic conditions at the site including the thickness and a description of soils and underlying alluvial and bedrock strata, to evaluate hydrogeologic conditions and to evaluate the vertical and lateral extent of soil contamination. Ground water monitoring wells will be installed in each of the five borings.

3.1.2 <u>Methodology</u>

Five test borings locations have been proposed for the site. Proposed boring locations are shown on Plate 2-1. The locations chosen include one bedrock stratigraphic test boring (GW-1) and four other locations to be drilled through the alluvium to bedrock around the perimeter of operational areas of the site. All five of the borings will be completed as monitoring wells. Shelby tube samples may also be collected from three borings to determine the permeability of the aquifer materials beneath the site.

The bedrock stratigraphic test (GW-1) will be drilled on the east side of the tank farm to provide data concerning thickness and the nature of bedrock stratigraphy in the east wall and floor of the alluvial valley. The boring will also provide information concerning the potential for migration of hydrocarbon contaminants into the bedrock east of the site. The test hole will be drilled with a Mobile B-80 drill rig utilizing air rotary methods to advance an 8 inch diameter boring to a depth of 100 feet. This is approximately the same elevation as the bottom of the alluvial fill found in boring TH-7, on the adjoining Livers Bronze property.

ISC-Kansas City Monitoring Well Work Plan January, 1992 Page 6

Borings GW-2, 3, 4 and 5 will be drilled at locations around the perimeter of the tank farm/office complex area. Locations are shown on Plate 2-1. These borings will be drilled with the Mobile B-80 drill rig equipped with hollow stem augers. The borings will be advanced to bedrock and continuously sampled using a split core barrel. The contents of each core barrel will be carefully described and logged.

All augered borings should be sampled at discrete two foot intervals or in visually contaminated zones. Cuttings will be collected for 5 foot intervals in the case of the boring for GW-1, which will be drilled with air rotary. Samples will initially be visually screened and submitted for analysis for VOCs, metals, pesticides/PCBs, and total petroleum hydrocarbons. Initially, four samples per boring will be selected for analysis.

Core barrels and other sampling equipment will be decontaminated between uses with a detergent and tap water wash, tap water rinse, distilled water rinse, and air dry. Other decontamination procedures will include the steam cleaning of the entire drill rig prior to and after use at the site. Hollow-stem augers and the working end of the drill rig will be steam cleaned between test borings.

Initially, soil samples will be selected for analysis based upon visual appearance in an attempt to determine the depth and volume of contaminated materials. Additional samples will be analyzed as needed in order to properly characterize contaminated areas. It is anticipated that about 25 percent of the total number of samples collected will be submitted initially for analysis. Once results of initial analyses have been reviewed, additional samples will be submitted as needed.

Duplicate samples will be collected representing at last 10 percent of the total number of samples sent for analysis. In addition, one field blank will be taken during sampling. Field blanks will be collected by pouring distilled water through decontaminated split-spoons. Table 3-1 contains a summary of analytical parameters, containers, etc. for proposed soil borings.

3.2 MONITORING WELL INSTALLATION

3.2.1 <u>Installation of Monitoring Wells</u>

Drilling and installation of four or five new monitoring wells is recommended in order to properly characterize the type and extent of contamination, if any, in ground water beneath the site. The wells would also provide data about hydraulic gradient, direction of ground water flow, and subsurface geology, including depth to bedrock. Construction of the wells will be consistent with methods described in the <u>Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells</u> (USEPA, 1991).

TABLE 3-1

SAMPLE ANALYTICAL SUMMARY (INITIAL)

SOIL BORING PROGRAM

INDUSTRIAL SERVICE CORPORATION (KCMO)

<u>ANALYSES</u>	<u>METHOD</u>	PRESERVATION	CONTAINERS	<u>SAMPLES</u>	<u>DUPLICATES</u>	<u>BLANKS</u> ^	TOTAL
Volatile Organics	SW846-8250	4°C	2-40 ml VOA vials	25	3	1	29
Metals: EP-Tox Total	SW846-1310 EPA 200.7	4°C	1 - 8 oz. glass	25	3	1	29
Pesticides/PCBs	SW846-8080	4oC	1 - 8 oz. glass	25	3	1 .	. 29
Total Petroleum Hydrocarbons	EPA 418.1	4oC	1 - 8 oz. glass	25	3	1	29

A - Equipment Blanks

2× 4200 Ambers

2× 4200 Ambers

2 -8 03 9/955

1-16 03 9/955

3.2.2 <u>Methodology</u>

Wells will be installed in each of the five soil borings to be drilled around the facility. The wells will be constructed in a manner as shown in Figure 3-1. Well GW-1 will be drilled using air rotary methods. Wells GW-2, 3, 4, and 5 will be drilled with eleven inch O.D. diameter hollow stem augers to the alluvium/bedrock contact. Upon test boring completion, the lead auger will be raised to the bottom of the selected screened interval, and the open borehole below the auger will be backfilled with Aquagel Goldseal bentonite, or equivalent. A one foot thick layer of clean sand will be placed upon the backfilled interval prior to well installation.

In the case of well GW-1, the boring will be backfilled with bentonite to the base of the first major limestone unit encountered by the drill. The first major limestone which could be considered a potential aquifer is most likely the Hertha Formation. It is proposed that a well be installed with screens opposite the Hertha to monitor water quality in that unit. Thickness of the formation is believed to be about fifteen feet.

Wells GW-2, GW-3, and GW-4 will be installed with 10 feet of screens straddling the water table. Well GW-5 which will be drilled approximately 10 feet from GW-4, will be installed with 10 feet of screens set on top of the alluvium/bedrock interface.

The wells will be constructed of 4 inch diameter, flush-joint screen and riser pipe. A 4 inch design is being used partially in anticipation of using some of the wells for ground water recovery and treatment. The screen will be ten feet long (15 feet in GW-1) and consist of .010 inch slot Schedule 40 PVC. The riser pipe will consist of 4 inch diameter Schedule 40 PVC. The well will be set through the hollow stem augers, if needed, and held in place while a clean sand pack is poured around the screen to a height of one to two feet above the screen. Two feet of 0.25 inch bentonite pellets will be placed in the annulus above the sand pack to prevent any grout material from percolating into the sand pack and entering the well. Care will be exercised during well installation to prevent sand or pellets from bridging in the annulus and to ensure a tight seal around the well. The remaining annulus will be tremmie grouted with Aquagel Goldseal bentonite slurry. A four inch thick 4 x 4 foot concrete pad will be poured at the surface, and the well will be secured with a protective steel casing and locking cap. All drilling equipment and well materials will be decontaminated with a high pressure hot water cleaning prior to use.

Following well installation, the wells will be developed by jetting with compressed air, or by bailing with 2 inch PVC bailers. The wells will be developed until they are as clay and silt-free as possible in order to ensure a good hydraulic connection between the aquifer and the well screen. Well development techniques used in the field will conform to the <u>Draft RCRA Groundwater Monitoring Technical Enforcement Document</u>, August, 1985.

GROUND WATER OBSERVATION WELL REPORT

Project Name Industrial Service Corporation	
	Piez./Well No.
Location 1633 South Marsh, Kansas City, Missouri	Project No.
Installed by	Date
Inspected by	Time
Method of Installation Hollow Stem Augers ,	
Remarks Proposed monitoring well construction	·
Generalized Stratigraphy A I.D./Type of surface ca steel protective cas Type of surface seal A x 4 ft. concrete pi Biev./Depth of top of seal I.D./Type of filter pack Sand I.D./Type of screen 4 in Schedul L.D./Type of screen 4 in Schedul Elev./Depth of bottom of Elev./Depth of bottom of Type of backfill below ob NA Elev./Depth of bottom of	sing 6-8 inch diameter ing with lock. 4 inch thick ad NA 4 inch PVC, 6 40 61 Goldseal Bentonite sel bentonite seal ter pack 2 ft. above screen seen d Pack ach PVC edule 40 0 inch servation well boring
Diameter of boring 1	0 inch+

Fig. _____

3.3 WATER LEVEL MEASUREMENTS AND CASING ELEVATIONS

3.3.1 Purpose

Top of the casing elevations will be surveyed on the five new wells, and ground water level measurements will be taken to aid in determining ground water flow directions at the site.

3.3.2 <u>Methodology</u>

Water levels will be measured as each monitoring well is completed, and one complete round of water level measurements will be taken after all the wells are completed. After the well casings are surveyed, water level data will be converted into ground water elevation data and used to determine ground water flow directions, vertical fluctuations and recharge/discharge areas. Water levels will be measured with a calibrated steel tape or an electric water level indicators 0.01 foot accuracy.

3.4 GROUND WATER SAMPLING PROGRAM

3.4.1 Purpose

Ground water samples will be collected from each ground water monitoring well to evaluate potential ground water contamination.

3.4.2 <u>Methodology</u>

After new monitoring wells are installed, a complete set of samples will be taken from all wells. It is recommended that all wells be sampled on a quarterly basis for at least the first year of monitoring. A comprehensive ground water monitoring plan for the site will be submitted upon receiving results of the first sampling event.

Ground water samples will be collected with a 2 inch diameter bottom-loading PVC bailer or stainless steel bailer with teflon fittings. Dedicated bailers will be installed in each well. A water level measurement and a depth sounding will be completed for each well in order to compute the volume of standing water. A minimum of three well volumes of water will be removed from each monitoring well prior to sampling to ensure that a representative sample of ground water is obtained.

Immediately following evacuation each well will be sampled with a bottom-loading bailer. The first bail of water removed after evacuating the well will be analyzed for pH, conductivity and temperature. The sample for laboratory analyses will be poured directly from the bailer into the appropriate laboratory prepared sample bottles and stored

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in a cooler of ice. The samples will be analyzed for VOCs, metals, and inorganic water quality parameters (carbonates, bicarbonates, sulfates, chlorides, total dissolved solids), and total petroleum hydrocarbons.

One duplicate sample will be collected and sent for analysis. In addition, a trip blank and a field blank will be taken on each day of ground water sampling. Equipment blanks will be collected by pouring distilled water through decontaminated bailers. The water will be collected in laboratory prepared bottles and shipped to the laboratory for analysis. A summary of analytical parameters, methods, containers, etc. needed for collection of ground water samples is found in Table 3-2.

3.5 PRELIMINARY DATA ANALYSIS

Data collected during the drilling and installation of the monitoring well will be summarized and evaluated to determine the site geology, hydrogeology, and extent of contamination. Existing standards will be reviewed to formulate conclusions and recommendations regarding the hazard potential at the Site. Recommendations for additional investigations or studies needed to complete characterization of the site will be presented. Additional work plans will be developed and submitted for review as needed.

3.5.1 <u>Geology</u>

Boring logs and well construction diagrams will be prepared and used to construct geologic cross-sections and to determine site stratigraphy.

3.5.2 <u>Hydrogeology</u>

Water level data will be analyzed and used to develop a ground water flow direction map.

3.5.3 <u>Extent of Contamination</u>

The extent of contamination will be determined by analysis of hydrogeologic and laboratory data from borings and ground water samples.

TABLE 3-2

SAMPLE COLLECTION SUMMARY

GROUND WATER SAMPLES (Initial Phase)

INDUSTRIAL SERVICE CORPORATION (KCMO)

<u>ANALYSES</u>	<u>METHOD</u>	PRESERVATION	<u>CONTAINERS</u>	<u>SAMPLES</u>	<u>DUPLICATES</u>	<u>BLANKS</u>	TOTAL
Volatile Organics	EPA-624	4°C	2-40 ml VOA vials	5	1	1	7
Metals (Total)	EPA-200.7	HNO ₃ , 4°C	1 l. poly	5	1	1	7
Inorganics		4°C	0.5 gal. plastic	5	1	0	6
Pesticides/PÇBs	EPA-608 ·	4oC .	0.5 gal. amber	5	1	0	6
Total Petroleum	EPA-418.1	4oC	0.5 gal. amber	5	1	0	6

TABLE 3-2(cont'd)

LISTING OF ANALYTICAL PARAMETERS

INDUSTRIAL SERVICE CORPORATION (KCMO)

Volatiles Method

Chloromethan	e
Bromomethan	e
Vinyl Chloride	:
Chloroethane	
Acetone	
Carbon Disulfi	ide
1,1-Dichloroet	hene
1,1-Dichloroet	hane
1,2-Dichloroet	hene
Chloroform	
1,2-Dichloroet	hane

2-Butanone
1,1,1-Trichloroethane
Carbon Tetrachloride
Vinyl Acetate
Bromodichloromethane
1,2-Dichloropropane
cis-1,3-Dichloropropene
Trichloroethene
Dibromochloromethane
1,1,2-Trichloroethane
Benzene

Trans-1,3-Dichloropropene
Bromoform
4-Methyl-2-Pentanone
2-Hexanone
Tetrachloroethene
1,1,2,2-Tetrachloroethane
Toluene
Chlorobenzene
Ethyl Benzene
Styrene

Metals (EP Tox, Total)

4	A ntimony
1	rium
_	Beryllium
	Cadmium
	Chromium

Mercury Nickel Silver Thallium Zinc Arsenic Selenium Lead

Xylenes (Total)

Inorganics

Alkalinity Sulfates Chlorides Dissolved Solids

PCB's

Aroclor - 1016 Aroclor - 1221 Aroclor - 1232 Aroclor - 1242 Aroclor - 1248 Aroclor - 1254 Aroclor - 1260

Other

Reactive Cyanides
Flash Point
pH
Reactive Sulfides
Total Petroleum Hydrocarbons

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4.0 SCHEDULE OF IMPLEMENTATION

The proposed schedule of activities relating to drilling, installation, development and initial sampling of the wells is shown on Table 4-1. Please note that the task for removal and plugging of the old wells is in the process of being completed.

FIGU 1-1 TENTATIVE SCHEDULE (PORATION (KCMO)

· •	···																
DAYS (10	ئىلىل	20 31	0 	بسن	0 6	0 7	اللبا	30 9 	0 10) 	0 12	0 13	0 1	0 1	50 1	60
1. Remove, plug existing wells		- :	1 1		·	·				. . 	.]			
2. Drill, install new wells	· l			(7	days)					. 1							l ·
3. Develop, sample new wells *					(3 day	s)						! -		 	<u> </u>		<u> </u>
4. Analytical work **										(6d	days)						1
5. Data review QA/QC review				****									(90 day	(a)		<u> </u>
6. Draft Report, Recommendations								<u> </u>]
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^{*}NOTE: Wells will be sampled on a quarterly basis - **NOTE: If additional samples need to be submitted after initial screening, schedules for data review & report may need to be adjusted.

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5.0 QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) to be followed for this project was originally submitted to MDNR as Section 6.0 of the Work Plan (Phase I) for a Remedial Investigation, Industrial Service Corporation, Kansas City, Missouri, dated April 3, 1990.

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6.0 HEALTH AND SAFETY PLAN

The Health and Safety Plan to be followed for this activity is that presented in Section 7.0 of Work Plan (Phase I) for a Remedial Investigation, Industrial Service Corporation, Kansas City, Missouri, dated April 3, 1990.

It is expected that site conditions will permit work to be performed in Level D, with contingency for Level C protection.





Division of Energy
Division of Environmental Quality
Division of Geology and Land Survey
Division of Management Services
Division of Parks, Recreation,
and Historic Preservation

STATE OF MISSOURI DEPARTMENT OF NATURAL RESOURCES

DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176
Jefferson City, MO 65102

CERTIFIED MAIL # P396 604 371 RETURN RECEIPT REQUESTED

February 25, 1992

RECEIVED

MAR 2 1992

ENGINEERING DEPT

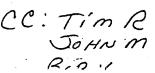
Mr. Kenneth J. Brooks
Project Manager/Geology
Industrial Service Corporation
P.O. Box 3249
Shawnee, KS 66203

RE: Ground Water Monitoring Well Installation Plan January 24, 1992 EPA I.D. Number: MOD073027609; Facility Location: 1633 S. Marsh Avenue, Kansas City, Missouri

Dear Mr. Brooks:

The Missouri Department of Natural Resources (MDNR) has reviewed the above-referenced plan for Industrial Service Corporation's (ISC) 1633 South Marsh Avenue site. This was done in accordance with 10 CSR 25-7.265, 40 CFR Part 265 Subparts F and G, and 40 CFR 265.197. The MDNR approves of the installation of five (5) ground water monitoring wells in accordance with the above-referenced plan. This review and approval was conducted by the Hazardous Waste Program's Permit Unit and Enforcement Section. This approval is contingent upon ISC complying with the following stipulations. Underlined portions of these stipulations refer to ISC's "Ground Water Monitoring Well Installation Plan, January 24, 1992."

- 1. ISC must determine whether an access agreement is necessary to gain access to wells R-1 and R-3. This is especially important for Well R-1 which, from the facility drawing, seems to be located off-site. ISC must assure that these wells are accessible when necessary for maintenance and sampling.
- 2. Section 2.4: ISC states that, "Any data from the wells is inconclusive. . . ." Granted, the "inconclusive" nature of previous samples and piezometric data caused by "inadequacies in well design" is not disputed. However, a positive indication of contamination in



Mr. Kenneth J. Brooks Page 2 February 25, 1992

such a well is a valid indication of the horizontal extent of contamination. The portion of the stratigraphy yielding the sample may not be clear if well construction is questionable, but the presence of contamination proves the existence of contamination at that point in the horizontal sense. Further, the stratigraphic information and depth of auger refusal would be valuable information that can still be used from previous investigations. The facility should use the information from previous investigations coupled with the information from this iteration of investigation to provide a comprehensive report characterizing geology, hydrology, all analytical data, and contamination to the extent possible. Where necessary, data from previous investigations can be qualified with appropriate statements regarding any limitations of the data. Portions of the data should not require any qualification.

This comprehensive report must be submitted within one hundred fifty (150) days of ISC receiving this approval as outlined in Section 4.0 of this January 24, 1992 ISC plan.

This schedule leaves ISC very little time to implement this plan. To accomplish this schedule ISC must begin drilling and installing new wells within thirty (30) days of receiving this approval.

- 3. <u>Section 2.4</u>: ISC mentions several subsurface investigations. The data from these previous subsurface investigations should be provided in the report to be submitted by ISC as referenced in number 2 above. If this data from previous subsurface investigations is contained in other reports that have been submitted to MDNR, those reports should be referenced.
- 4. <u>Section 3.1</u>: All auger cuttings, decontamination fluids, and any other material generated as a result of implementing this plan shall be managed as hazardous waste until it can be demonstrated that the material is not a hazardous waste.
- 5. Section 3.1.2: ISC proposes five test borings which will be completed as monitoring wells. This proposal may not provide a large enough well network to determine extent of contamination. However, an iterative approach is appropriate. The reporting of this investigation, as referenced in number 2 above, must include a proposal for further investigation if the extent of contamination is not established by this well network.
- 6. Section 3.1.2: The bedrock stratigraphic test will not provide a definitive assessment of the nature of bedrock in the floor of the alluvial valley, contrary to the statements on page 5. The proposed test will not go deeper than the depth of the adjacent alluvium.

Mr. Kenneth J. Brooks Page 3 February 25, 1992

The test will be in bedrock which is not present below the adjacent alluvium. The weathering of the bedrock at that depth should be significantly greater under the alluvium due to exposure and relief of bedrock overburden weight. Permeability of the bedrock should be higher in the floor of the alluvial valley than in the adjacent test boring site. However, the proposed boring will be useful to determine the horizontal interconnection of the adjacent bedrock materials with the alluvium, and detect presence of contamination at this location.

In light of these concerns, ISC may be required in the future to complete another bedrock stratigraphic test.

- 7. Section 3.1.2: This section also discusses obtaining undisturbed soil samples for determining the permeability of the aquifer materials beneath the site. This section states that Shelby tube samples may be collected from three borings. ISC must collect undisturbed soil samples from a minimum of three soil borings and preferably all five borings. Undisturbed soil sample collection and any permeability testing must be conducted by approved ASIM standards or their equivalent.
- 8. <u>Section 3.1.2</u>: This section also discusses analyzing approximately 25% of the samples and submitting other samples for analysis based upon initial results. ISC should be sure to properly preserve all samples and to perform all necessary analyses prior to the expiration of sample holding times.
- 9. <u>Section 3.1.2</u>: The decontamination process should include an acid rinse since metals are an analyte.
- 10. Section 3.1.2: ISC must be able to demonstrate that the distilled water used for decontamination, field blanks, or equipment blanks is of a quality that will not affect data integrity. Typically distilled water from retail outlets is not of sufficient quality to prevent contamination from the distilled water itself.
- 11. <u>Section 3.2.1</u>: All five (5) soil borings must be developed into monitoring wells as stated in Section 3.1.2, not "four or five" as stated in Section 3.2.1.
- 12. Section 3.2.2: The proposed air drilling method to be used in the bedrock boring will yield a limited amount of stratigraphic information since textural features such as fractures and rock competence cannot be evaluated from cuttings. Initial samples from the boring may be affected by previous volatilization of contaminants due to the air drilling method. All borings may be

Mr. Kenneth J. Brooks Page 4 February 25, 1992

developed by jetting with compressed air, according to the plan. Initial samples may also be affected by volatilization of contaminants due to the air jetting. Purging prior to sampling should continue until measurements of pH, temperature and specific conductance stabilize (+ or - 10%) on successive well volumes.

- 13. <u>Section 3.2.2</u>: ISC believes that the first potential aquifer would be the Hertha Formation. In the report to be submitted as a response to number 2, ISC must provide the stratigraphic log to verify this statement.
- 14. Section 3.3: ISC discusses surveying the top of the casing elevations on the five new wells. In addition to establishing vertical control, ISC must also survey the horizontal locations of the five new monitoring wells. The well locations must be determined to the nearest 0.01 foot and referenced to the same permanent benchmark that will be used for vertical control. This survey must be conducted by a land surveyor registered in Missouri and this survey must be submitted with the report referenced in number 2 above.
- 15. Section 3.4.2: When calculating the volume of water to be removed from a well prior to sampling, ISC must include the volume of water stored in the sandpack in the calculation. The water removed from the wells and any other material generated during implementation of this plan must be managed as a hazardous waste until it can be demonstrated that the material is not a hazardous waste. This includes auger cuttings and decontamination fluids as discussed in number 4 above.
- 16. <u>Table 3-2</u>: The list of analytical parameters must include, at a minimum, the following compounds:

Gamma-BHC (Lindane),
Heptaclor,
2,4,5,-TP (Silvex),
2,4-D,
Heptachlor epoxide,
Napthalene,
Bis(2-ethylhexyl) phthalate,
Phenanthrene,
Pyrene,
1,2-Dichlorobenzene, and
Trans-1-2-Dichloroethene.

These compounds have been detected in the soils at the ISC facility. Expanding Table 3-2 to include the above compounds would satisfy Comment 1 of the January 14, 1992, MDNR closure comment letter to ISC.

Mr. Kenneth J. Brooks Page 5 February 25, 1992

Laboratory analysis for the analytical parameters must be in accordance with EPA publication SW-846, "Test Methods for Evaluating Solid Waste" or some other appropriate laboratory methods. ISC must specify in the data submittal the laboratory methods that were used to analyze for the parameters in Table 3-2.

The Toxicity Characteristic Leaching Procedure (TCLP) (40 CFR 261, Appendix II) must be conducted on all samples, rather than the "EP Tox" procedure as stated in Table 3-2. It should be noted that the list of parameters for the TCLP test is considerably longer than the parameter list for the EP Tox procedure. The total concentration of each TCLP parameter should be determined in addition to the concentration of the parameter in the leachate.

- 17. <u>Section 6.0</u>: ISC should be sure to comply with all applicable Occupational Safety and Health Administration (OSHA) regulations.
- 18. The MDNR's Kansas City Regional Office, (816) 795-8655 and Mr. Tom Ratermann of the Hazardous Waste Program, (314) 751-3176 must be notified ten (10) days prior to initiating work at this site.

Failure to comply with any of the stipulations contained in this letter may result in MDNR taking enforcement action to assure ISC's compliance with the stipulations. If there are any questions regarding this letter, please contact me at (314) 751-3176.

Sincerely,

HAZARDOUS WASTE PROGRAM

Tom Ratermann

Environmental Engineer

TR: ji

c: Lynn Harrington, EPA, Region VII Kansas City Regional Office